TRANSACTIONS

OF THE

LINNEAN SOCIETY.

VOLUME VII.

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THE TRANSACTIONS OF THE LINNEAN SOCIETY OF LONDON.

VOLUME VII.

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MISSOURI
BOTANICAL
GARDEN.

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CHARTER

CHARTER

OF THE

LINNEAN SOCIETY OF LONDON.

GEORGE THE THIRD, by the Grace of God, of the United Kingdom of Great Britain and Ireland King, Defender of the Faith, To all to whom these Presents shall come, greeting. WHEREAS several of Our loving Subjects are desirous of forming a Society for the Cultivation of the Science of Natural History in all its Branches, and more especially of the Natural History of Great Britain and Ireland, and, having subscribed considerable Sums of Money for that Purpose, have humbly besought Us to grant unto them, and such other Persons as shall be approved and elected, as hereinafter is mentioned, Our Royal Charter of Incorporation for the Purposes aforesaid; KNOW YE, that We, being desirous to promote every Kind of Improvement in the Arts and Sciences, have, of Our especial Grace, certain Knowledge, and mere Motion, given and granted, and We do hereby give and grant, that Our right trusty and right well beloved Cousin and Counsellor *George* Earl of *Dartmouth*, Our

Object of the Society.

Incorporation.

trusty and well beloved *James Edward Smith* Doctor of Physick, *Thomas Marsham* Esquire, *Alexander MacLeay* Esquire, *Jonas Dryander* Esquire, The Reverend *Samuel Goodenough* Doctor of Laws, *Aylmer Bourke Lambert* Esquire, *Richard Anthony Salisbury* Esquire, *William George Maton* Doctor of Physick, *Thomas Furly Forster* Esquire, *Charles Hatchett* Esquire, *William Lewis* Esquire, The Reverend *Thomas Rackett* Clerk, *John Symmons* Esquire, and *Thomas Young* Doctor of Physick, and such others as shall, from Time to Time, be appointed and elected, in the Manner hereinafter directed, and their Successors, be and shall for ever hereafter continue and be, by virtue of these Presents, one Body Politic and Corporate, by the Name of "THE LINNEAN SOCIETY OF LONDON;" and them and their Successors for the Purposes aforesaid, WE do hereby constitute and declare to be one Body Politic and Corporate, and by the same Name to have perpetual Succession, and for ever hereafter to be Persons able and capable in the Law, and have Power to purchase, receive and possess any Goods and Chattels whatsoever, and (notwithstanding the Statutes of Mortmain) to purchase, hold, and enjoy, to them and their Successors, any Lands, Tenements, and Hereditaments whatsoever, not exceeding, at the Time or Times of purchasing such Lands, Tenements, and Hereditaments, respectively, the yearly Value, at a Rack Rent, of One thousand Pounds in the whole, without incurring the Penalties or Forfeitures of the Statutes of Mortmain, or any of them; And, by the Name aforesaid, to sue and be sued, plead and be impleaded, answer and be answered unto, defend and be defended, in all Courts and Places whatsoever of Us, Our Heirs and Successors, in all Actions, Suits, Causes, and Things whatsoever, and to act and do in all Things relating to the said Corporation in as ample Manner and Form as any other our liege Subjects, being Persons able

Corporate Name.

Power to purchase, &c.

Land of the yearly Value of 1000l.

To sue and be sued.

able and capable in the Law, or any other Body Politic or Corporate, in Our said United Kingdom of Great Britain and Ireland, may or can act or do; And also to have and to use a Common Seal, and the same to change and alter, from Time to Time, as they shall think fit. And We do hereby declare, and grant, that there shall be an indefinite Number of Fellows of the said Society; and that they the said *George* Earl of *Dartmouth*, *James Edward Smith*, *Thomas Marsham*, *Alexander MacLeay*, *Jonas Dryander*, *Samuel Goodenough*, *Aylmer Bourke Lambert*, *Richard Anthony Salisbury*, *William George Maton*, *Thomas Furly Forster*, *Charles Hatchett*, *William Lewis*, *Thomas Rackett*, *John Symmons*, and *Thomas Young*, shall be the first Fellows of the said Society; and that any Five, or more of them, all having been first duly summoned to attend the Meetings of the said Fellows, shall and may, on or before the Twenty-fourth Day of May, next ensuing the Date of these Presents, under their respective Hands' writing, appoint such other Persons to be Fellows, Honorary Members, Foreign Members, and Associates, of the said Society, as they may respectively think fit. And We do further declare and grant, that, for the better Rule and Government of the said Society, and for the better Direction, Management, and Execution of the Business and Concerns thereof, there shall be henceforth for ever, a Council, President, Treasurer, and Secretary, of the said Society, to be elected in Manner hereinafter mentioned; and that such Council shall consist of Fifteen Members, to be elected from among the Fellows, as hereinafter directed, whereof any Five shall be a Quorum: And We do hereby nominate and appoint the said *George* Earl of *Dartmouth*, *James Edward Smith*, *Thomas Marsham*, *Alexander MacLeay*, *Jonas Dryander*, *Samuel Goodenough*, *Aylmer Bourke Lambert*, *Richard Anthony Salisbury*, *William George Maton*, *Thomas Furly*

Common Seal.

Number of Fellows indefinite.

First Fellows named.

Any Five or more of them shall, on or before the 24th of May, 1802, appoint other Members.

A Council to consist of 15 Fellows:

5 of whom to be a Quorum.

First Council named.

 Forster,

Forster, *Charles Hatchett*, *William Lewis*, *Thomas Rackett*, *John Symmons*, and *Thomas Young*, to be the first Council; the said *James Edward Smith*, to be the first President; the said *Thomas Marsham*, to be the first Treasurer; and the said *Alexander McLeay*, to be the first Secretary, to the said Society: All and each of the aforesaid Officers and Counsellors to continue in such their respective Offices until the Twenty-fourth Day of May One thousand eight hundred and three; and that the said *James Edward Smith* shall have Power to appoint such Four Persons, from and amongst the Members of the said Council, to be Vice-Presidents of the said Society, as he shall think fit, until some other Persons shall be chosen in their respective Rooms, in the Manner hereinafter mentioned. And it is Our further Will and Pleasure, that the Fellows of the said Society, or any Twenty-one or more of them, shall and may, on the Twenty-fourth Day of May, One thousand eight hundred and three, and also shall and may, on the Twenty-fourth Day of May in every succeeding Year, unless the same shall happen to be on a Sunday, and then on the Day following, assemble together at the then last, or other usual Place of meeting of the said Society, and proceed, by Method of Ballot, to put out and amove any Five of the Members who shall have composed the Council of the preceding Year; and shall and may, in like Manner, by Method of Ballot, elect Five other discreet Persons from amongst the Fellows of the said Society, to supply the Places and Offices of such Five as may have been so put out and amoved; it being Our Royal Will and Pleasure, that One-third of the Members of the said Council, and no more, shall be annually changed and removed by the Fellows of the said Society: And, also, that they, the said Fellows, or any Twenty-one or more of them, shall and may, at the Time and Place, and in Manner aforesaid, by Method of Ballot, elect, from among the Members of the said Council, when

First President. First Treasurer. First Secretary. To continue in Office till 24th of May, 1803.

The first President to appoint 4 Members of the first Council to be Vice-Presidents.

The Fellows, or any 21 or more of them, on the 24th of May 1803, and yearly thereafter, shall, by Ballot, remove 5 Members of the Council for the preceding Year, and elect Five other Fellows in their Room;

and shall elect from amongst the Council a President, Treasurer, & Secretary for

when formed and elected, in Manner aforesaid, Three fit and proper Persons, one of such Persons to be President, another of such Persons to be Treasurer, and the other of such Persons to be Secretary of the said Society, for the Year ensuing; And also, in like Manner, shall and may, in case of the Death of any of the Members of the Council, or of the President, Treasurer, or Secretary, for the Time being, within the Space of Three Months next after such Death or Deaths, in like Manner, elect other discreet Persons, being Fellows of the said Society, to supply the Places and Offices of such Members of the said Council, or of the President, Treasurer, or Secretary, so dying: And also shall and may appoint such other Persons to be Officers of the said Society for the Year ensuing, as they may think proper and necessary, for the transacting and managing the Business thereof. And it is Our further Will and Pleasure, that, so soon after the Elections aforesaid as conveniently may be, the Person who shall at any time hereafter be elected to be President of the said Society, in Manner aforesaid, may and shall nominate and appoint Four Persons, being Members of the said Council, to be Vice-Presidents of the said Society for the Year ensuing. And We do further declare and grant, that, from and after the said Twenty-fourth Day of May, now next ensuing, the Fellows of the said Society, or any Eleven or more of them, shall and may have Power, from Time to Time, at the General Meetings of the said Society, to be held at the usual Place of Meeting of the said Society, or at such other Place as shall have been in that Behalf appointed, by and with the Consent of the said Society as hereinafter mentioned, to elect such Persons to be Fellows, Honorary Members, Foreign Members, and Associates of the said Society, and all Fellows, Honorary Members, Foreign Members, and Associates, to remove from the said Society as they shall think fit: And that the Council hereby

the Year ensuing.

Vacancies in the Council, &c. occasioned by Death, to be filled up within Three Months.

Fellows to appoint such other Officers as they may think fit.

The President annually to appoint Four Vice-Presidents.

Power of electing and removing Members, after the 24th of May next, vested in the Fellows, or any 11 or more of them.

The Council, or any 5 or more of them, all having been summoned, empowered to make Bye-Laws,

hereby appointed, and the Council of the said Society for the Time being, or any Five or more of them, all the Members thereof having been first duly summoned to attend the Meetings thereof, shall and may have Power, according to the best of their Judgment and Discretion, to make and establish such Bye-Laws as they shall deem useful and necessary for the Regulation of the said Society, and of the Estate, Goods, and Business thereof; and for fixing and determining the Times and Places of meeting of the said Society, and also the Times, Place, and Manner of electing, appointing, and removing all Fellows, Honorary Members, Foreign Members, and Associates, of the said Society, and all such subordinate Officers, Attendants, and Servants, as shall be deemed necessary or useful for the said Society; And also for filling up, from Time to Time, any Vacancies which may happen by Death, Removal or otherwise, in any of the Offices or Appointments constituted or established for the Execution of the Business and Concerns of the said Society; and for regulating and ascertaining the Qualifications of Persons to become Fellows, Honorary Members, Foreign Members, and Associates, of the said Society respectively, and also the Sum and Sums of Money to be paid by them respectively, whether upon Admission or otherwise, towards carrying on the Purposes of the said Society; And such Bye-Laws, from Time to Time, to vary, alter, or revoke, and make such new and other Bye-Laws as they shall think most useful and expedient, so that the same be not repugnant to these Presents, or to the Laws of this Our Realm: Provided that no Bye-Law hereafter to be made, or Alteration or Repeal of any Bye-Law which shall hereafter have been established by the said Council hereby appointed, or by the Council for the Time being of the said Society, shall be considered to have passed, and be binding on the said Society, until such Bye-Law, or such Alteration or Repeal of any Bye-Law, shall have been

and to alter such Bye-Laws;

but no Bye-Law, or Alteration, shall be binding on the Society until it shall have been confirmed by Ballot, at a General Meet-

been hung up in the common Meeting-Room of the said Society, and been read by the President, or by any one of the Vice-Presidents for the Time being, at Two successive General Meetings of the said Society, and until the same shall have been confirmed by Ballot, by the Fellows at large of the said Society; such Ballot to take place at the ensuing Meeting next after such Two successive General Meetings of the said Society, Eleven, at least, of the Fellows of the said Society being present; and provided that no such Bye-Law, or Alteration or Repeal of any Bye-Law, shall be deemed or taken to pass in the affirmative, unless it shall appear, upon such Ballot, that Two-thirds of the Fellows present at such Meeting shall have voted for the same. WITNESS His Majesty at Westminster, the Twenty-sixth Day of March, in the Year of our Lord One thousand eight hundred and two. ing, 11 Fellows at least being present.

WILMOT.

BYE-

BYE-LAWS

OF THE

LINNEAN SOCIETY OF LONDON,

AS CONFIRMED AT A GENERAL MEETING OF THE SOCIETY HELD ON THE 6TH OF JULY 1802.

CHAPTER I.

Of the Election and Admission of Fellows.

SECTION I. EVERY Fellow who intends to propose any Person to be a Fellow of the Society, shall, before such Person be proposed, make known to him the Nature of the Obligation into which he is to enter, in the event of his being elected; and also the Sum which is to be paid for Admission-Money, the Rate of Annual Payments, and the Sum to be paid in lieu of Annual Payments, for the Use of the Society.

II. Every Candidate for Admission as a Fellow shall be proposed and recommended by Three or more Fellows, who shall, at a General Meeting of the Society, cause to be delivered to the Secretary a Paper, signed by themselves, specifying the Christian Name, Surname, Rank, Profession, Qualifications, and the usual Place of Residence of such Person; all which shall be certified from their personal Acquaintance with him or with his Writings.

III. No

III. No Person shall be proposed as a Fellow, or be capable of being elected as such, until he shall have fully attained the Age of Twenty-one Years.

IV. Each Recommendation of a Candidate for Admission as a Fellow, shall be hung up in the common Meeting-Room of the Society, the Date of the Day on which it shall be presented being previously written on it, and shall be read at Three successive General Meetings, between the Meeting at which the same shall be presented and the Meeting at which the Ballot for Election shall take place.

V. No Person shall be declared to be elected a Fellow, unless he have in his Favour Two-thirds of the Number balloting.

VI. Every Person chosen a Fellow shall have immediate Notice of his Election given to him by the Secretary, and shall appear personally for his Admission within the Space of Two Months from the Day of his Election, or within such further Time as shall be granted by the Society or Council, upon special Application being made to them for that Purpose; and, in default of his so appearing, his Election shall be void.

VII. No Person elected shall be admitted a Fellow of the Society, until he shall have paid his Admission-Fee, and given the usual Bond for the Payment of Yearly Contributions, or paid the Sum appointed in lieu of such Contributions.

VIII. Every Person elected a Fellow of the Society shall, before his Admission, subscribe an Obligation in the following Words, viz. " We who have hereunto subscribed do hereby " promise, each for himself, that we will endeavour to promote " the Good of *The Linnean Society of London*, and to pursue the " Ends for which the same was instituted: That we will be present " at the Meetings of the Society, as often as conveniently we " can, especially at the Anniversary Elections, and upon extraor-

" dinary Occasions; and that we will observe the Statutes, Bye-" Laws, and Orders of the said Society. Provided that, when-" soever any of us shall signify to the President, under his Hand, " that he desires to withdraw from the Society, he shall be free " from this Obligation for the future." And if any Person should refuse to subscribe the said Obligation, the Election of that Person shall be void.

IX. The Admission of every Fellow shall be at some Meeting of the Society in Manner and Form following, viz. The President, taking him by the Hand, shall say, " A. B. By the Authority " and in the Name of the Linnean Society of London, I admit " you a Fellow thereof."

X. No Person shall be deemed an actual Fellow of the Society, nor shall the Name of any Person be printed in the Annual List of the Fellows of the Society, until such Person shall have paid his Admission Fee, and given the usual Bond for the Payment of Annual Contributions, or paid the Sum appointed in lieu of such Contributions; and no such Person shall have Liberty to vote at any Election or Meeting of the Society, before he shall have been admitted as directed in the preceding Section.

CHAPTER II.

Of the Payments to be made by the Fellows.

Sect. I. All Fellows elected on or before the Twenty-fourth Day of May 1802, who have already paid their Admission-Fees, but have not paid the Sum of Ten Guineas at one Payment, in lieu of all Annual Contributions, shall pay to the Use of the Society the Annual Sum of One Guinea; the First Payment to become due

due on the Twenty-fourth Day of May 1803. Provided, however, that every such Fellow may, at any Time, compound for all future Annual Payments by paying the said Sum of Ten Guineas, including the Annual Guinea which may be due at the Time such Composition shall be paid.

II. Every Person who shall be elected a Fellow after the Twenty-fourth Day of May 1802, shall, before he be admitted, pay to the Use of the Society the Sum of Three Guineas for his Admission-Fee. And if any such Person refuse or fail to pay the said Sum, his Election shall be void; unless the Admission-Fee be remitted in whole or in part, by special Order of the Council.

III. Every Fellow who shall be elected after the Twenty-fourth Day of May 1802, shall, besides the Admission-Fee, further contribute towards the Funds of the Society, previous to his Admission, by paying the Sum of Twenty Guineas in lieu of all future Payments; or he shall execute a Bond, in the penal Sum of Twenty Pounds, for the regular Payment of Two Guineas per Annum to the Society, so long as he shall continue a Fellow. But, if any such Person be not usually resident within the United Kingdom of Great Britain and Ireland, such Person shall not be permitted to give Bond for the Payment of Annual Contributions, but shall, within Two Months after his Election, and before he be admitted, pay, or cause to be paid, into the Hands of the Treasurer, the Sum of Twenty Guineas, in lieu of such Contributions.

IV. Every Fellow who shall be elected after the Twenty-fourth Day of May 1802, may, at any Time, compound for his future Contributions by paying the Sum of Twenty Guineas in One Year, instead of the Annual Contribution for that Year; and, in such Case, his Bond shall be delivered up.

 V. All

V. All Yearly Contributions shall be considered due and payable at each Anniversary Meeting for the Year preceding; but no Fellow elected on or after the First Day of February in any Year, shall pay the Annual Contribution at the Anniversary Meeting which shall immediately follow his Election.

VI. If any Fellow paying Yearly Contributions should fail to bring, or send in the same to the Treasurer, within Twelve Months after each Anniversary Meeting, unless the said Payment be remitted in whole or in part by special Order of the Council, his Bond shall be put in Suit for the Recovery thereof, and he shall be liable to Ejection from the Society; upon which the Council shall proceed as they may see Cause.

CHAPTER III.

Of the Honorary Members.

SECT. I. The Number of Honorary Members shall not exceed Four.

II. When a Vacancy shall occur in the Number of Honorary Members, the Fellows shall, at the then next, or any succeeding Anniversary Meeting, as they shall think fit, elect, by open Vote, a distinguished Personage to fill such Vacancy; provided that no such Personage shall be considered as elected unless Two-thirds of the Number of Fellows present shall have voted for him.

III. As soon as may be after the Election of any Honorary Member, the President shall announce such Election to him by Letter, and at the same Time transmit to him a printed Copy of the Statutes and Bye-Laws of the Society, with a List of the Members.

CHAPTER IV.

Of the Foreign Members.

SECT. I. No Person shall be elected a Foreign Member of the Society until the Number remaining of those elected on or before the Twenty-fourth Day of May 1802 shall be less than Fifty, to which Number the Foreign Members shall, from thenceforward, be limited; and no Person shall be proposed as a Foreign Member until a Vacancy shall have been actually declared to the Society.

II. Each Certificate proposing a Candidate for Election as a Foreign Member shall be signed by Six or more Fellows, and shall specify his Christian Name, Surname, Titles, Works, Quality or Profession, and his Place of Residence. Such Certificate shall be presented at one of the General Meetings of the Society, on or before the Seventh Day of February in every Year; and, after being read, shall be fixed up in the public Meeting-Room, where it shall continue until the Election, which shall take place at the Meeting immediately preceding the Anniversary. Each Certificate is also to be read at every Meeting of the Society which may intervene between the Time of its being presented and the Day of Election.

III. At the General Meeting immediately preceding the Anniversary, the President, or Vice-President in the Chair, shall declare the Number of Vacancies, and the Number of Candidates proposed as aforesaid, who shall then be severally balloted for, in alphabetical Order; and those Candidates who shall have the greatest Number of Votes shall be declared as elected: Provided, however, that no Person shall be considered as duly elected, unless he have in his Favour Two-thirds of the Number voting.

IV. In

IV. In case of an Equality of Votes in Favour of Two or more Candidates, whose Number shall exceed the Number of Vacancies to be filled up from them, the Excess of such Number shall be excluded by Lots, to be drawn by the President, or Vice-President in the Chair; and the Person or Persons whose Name or Names shall remain undrawn shall be declared to be duly elected.

V. There shall be transmitted to each Foreign Member, as soon as may be after his Election, a Diploma in the Latin Language, under the Common Seal of the Society, signed by the President, or one of the Vice-Presidents, and countersigned by the Secretary.

VI. No British Subject, nor any Person usually residing in any of the British Dominions, unless he be an Ambassador from a Foreign Court, shall be elected a Foreign Member of the Society.

CHAPTER V.

Of the Associates.

Sect. I. The Number of Associates shall be indefinite, but shall include only such Persons as usually reside in the British Dominions.

II. Every Candidate for Election as an Associate shall be proposed, recommended, and balloted for in like Manner, in all Respects, as is directed in the Second, Third, and Fourth Sections of Chapter I. respecting the Election of Fellows.

III. The Secretary shall, immediately after the Election of any Person as an Associate, announce the same, by Letter, to the Person who may be so elected, and shall transmit to him a printed Copy of the Statutes and Bye-Laws of the Society, with the List of the Members.

CHAPTER VI.

Of the Death or Withdrawing of Members.

SECT. I. Upon the Death or the voluntary Withdrawing of any Fellow, Honorary Member, Foreign Member, or Associate, the Secretary shall note such Death or Withdrawing in the printed List of that Year; and the Death or Withdrawing of any Member shall be entered upon the Minutes of the Society at the then next Anniversary Meeting.

II. No Fellow shall be understood to have withdrawn himself from the Society, until he shall have signified such his Intention by Letter, under his Hand, addressed to the President; and if such Letter be not left at the Apartments of the Society, between the Twenty-fourth Day of May in any Year and the First Day of February next following, the Contribution of such Fellow shall be understood to be continued for the Whole of the Year in which he shall have so withdrawn himself.

CHAPTER VII.

Of the Causes and Form of Ejection.

SECT. I. If any Member of the Society should, contemptuously, or contumaciously, disobey the Statutes or Orders of the Society or Council; or should, by speaking, writing, or printing, publickly defame the Society; or advisedly, maliciously, or dishonestly, do any Thing to the Damage, Detriment, or Dishonour thereof, he shall be ejected from the Society.

II. When-

II. Whensoever there shall be Cause for the Ejection of any Member from the Society, the President shall, at some Meeting thereof, propose the Ejection of such Member; and at the next General Meeting the Question shall be put to the Ballot, and if Two-thirds of the Members present vote for it, the President shall cancel the Name of such Person in the Register, and at the same Time pronounce him ejected in these Words, viz. " By the " Authority and in the Name of the Linnean Society of London, " I declare A. B. to be now ejected and no longer a (Fellow, &c. " as the Case may be) thereof." And the Ejection of every such Person shall be then recorded in the Minute-Book of the Society; and his Name, as ejected, shall be read at the next Anniversary Meeting.

III. All Persons ejected from the Society shall be thereby rendered incapable of belonging to it in future.

CHAPTER VIII.

Of the Election of the Council and Officers.

SECT. I. Every Fellow of the Society residing in, or within the Distance of Sixty Miles from, London, and whose Residence may be known to the Secretary or Clerk, shall be summoned to the Anniversary Meetings for electing the Council and Officers for the Year ensuing, by a Letter signed by the Secretary; and such Summons shall be sent by Post, to the House or Lodging of every such Fellow, a Week at the least before the Election, which by the Charter is directed to take place annually on the Twenty-fourth Day of May, being the Birth-Day of the celebrated Linnæus; unless that Day shall happen to be on a Sunday, and then on the

Day

Day following. And each Anniversary Meeting shall also be advertised in Two or more of the public Newspapers, at least One Week before the same take place.

II. The Council for the Time being shall, before the Day of Election, cause to be prepared a sufficient Number of printed Balloting-Lists, according to the annexed Forms; One of which (No. I.) is to contain the Names of such Persons as they shall recommend to be removed from and elected into the Council, and the other (No. II.) to contain the Names of such Persons as they shall recommend to fill the Offices of President, Treasurer, and Secretary, for the ensuing Year.

III. On the Day of Election the President, or in his Absence the senior Vice-President present, shall take the Chair precisely at One o'Clock, P M. and shall immediately open the Business of the Day; Two Balloting-Glasses being placed before the Chair. One of those Glasses shall remain open for receiving Lists for the Council until Half past Two o'Clock, and the other Glass shall remain open for receiving Lists for the Officers until Three o'Clock, P. M., at which respective Times the Ballots shall be closed.

IV. Balloting-Lists shall be delivered to every Fellow who shall apply for them; and if any Fellow should not approve of the Persons therein named, but be desirous of giving his Vote for some other Person or Persons, he will strike his Pen across the printed Name or Names of the Person or Persons of whom he may disapprove, and will write over against such printed Name or Names on the blank Side left and prepared for that Purpose, the Name or Names of the other Person or Persons for whom he may be desirous to give his Vote.

V. Each Fellow voting shall deliver his Balloting-List or Lists, folded up, to the President or Vice-President in the Chair, who

shall, in his Presence, immediately put such List or Lists into the respective Glasses; and the Name of each Fellow who shall so deliver in his List or Lists shall be marked on a printed List of the Fellows, by the Secretary, or by the Person officiating in his stead.

VI. When the Ballot for the Council shall have been closed, the President or Vice-President in the Chair shall appoint Three Scrutineers, not Members of the Council, to examine the Lists, and report the Result of the Ballot: One of those Scrutineers shall open and read aloud each List deposited in the Balloting-Glass, and file it, while the other Two Scrutineers shall mark the Names; and when all the Lists shall be drawn and read, the Scrutineers shall cast up the Number of the Votes for each Person, whether to be removed from or elected into the Council, and shall report the same to the President or Vice-President in the Chair, who shall then declare the Five Persons for whose Removal from the Council there shall be the Majority of Votes, to be removed accordingly; and the Five Persons for whose Election there shall be a Majority of Votes, to be elected Members of the Council for the ensuing Year accordingly.

VII. When the Members of the Council for the ensuing Year shall have been declared, and not before, the President or Vice-President in the Chair shall appoint the same or Three other Scrutineers, not being Members of the Council, to examine the Lists and report the Result of the Ballot for President, Treasurer, and Secretary; and such Examination and Report being made agreeably to the Directions contained in the preceding Section respecting the Council, the President or Vice-President in the Chair shall declare those who have the Majority of Votes to be the Persons elected to the respective Offices.

VIII. If any List should contain more than the proper Number

of

of Names, or if any List for Officers should include the Name of any Person not being a Member of the Council, such List shall be set aside, and not taken any account of by the Scrutineers in casting up the Number of Votes.

IX. In case of an Equality of Votes for the Removal from the Council, or for the Election of Two or more Persons, whose Number together shall exceed the Number to be removed or elected exclusive of those having a Majority of Votes, the Excess of such Number shall be secluded by Lots, to be prepared by the Scrutineers and drawn by the President or Vice-President in the Chair; and the Person or Persons whose Name or Names shall remain undrawn shall be declared to be removed from or elected into the Council, or elected to any of the Offices, as the Case may be.

X. If Twenty-one Fellows at least do not appear and give in their Balloting-Lists during the Time limited for keeping the Ballot for the Council open, or if any Question should arise in the course of an Election, respecting the Forms thereof, and cannot be decided by the Fellows present, the Election shall be adjourned to the next convenient Day, of which Notice by Letter shall be given to all the Fellows of the Society, in the same Manner as is directed in the First Section of this Chapter.

XI. In case of a Vacancy in the Council, or among the Officers of the Society, happening during the Intervals of the Anniversary Elections, the Council shall appoint a Special General Meeting, for the Purpose of filling up such Vacancy; and the Summons for such Meeting, and the Proceedings at it, shall, as far as Circumstances will admit, be after the same Manner as is directed for the Anniversary Elections.

CHAPTER IX.

Of the President.

Sect. I. The Business of the President shall be to preside in all the Meetings, and regulate all the Debates of the Society, Council, and Committees; to state and put Questions, which shall have been moved and seconded, both in the Affirmative and Negative, according to the Sense and Intention of the Meetings; to call for Reports and Accounts from Committees and others; to check Irregularities, and to keep all Persons in the Meetings to Order; to cause all Extraordinary Meetings of the Council and Committees to be summoned when necessary; and, generally, to execute, or see to the Execution of, the Statutes and Bye-Laws of the Society.

II. The President shall take place of every Member of the Society, at the ordinary Place of Meeting; and also in all other Places where any Number of the Members shall meet as a Society, Council, or Committee; and, being in the Chair, may be covered, while speaking to or hearing particular Members, notwithstanding their being uncovered.

CHAPTER X.

Of the Treasurer and his Accounts.

Sect. I. The Treasurer, or some Person appointed by him, shall receive for the Use of the Society all Sums of Money due or payable to the Society; and out of such Money shall pay and disburse

disburse all Sums of Money which may be due from or payable by the Society; and shall keep particular Accounts of all such Receipts and Payments.

II. Every Sum of Money payable on account of the Society, amounting to Five Pounds or upwards, shall be paid by Order of the Council, signed by the President, and registered by the Secretary.

III. All Sums of Money in the Hands of the Treasurer, which there shall not be present Occasion for expending or otherwise disposing of for the Use of the Society, shall be laid out in such Government or other Securities as shall be approved of and directed by the Council.

IV. One Guinea of the Sum to be paid by each Fellow for his Admission-Fee being for the Support of a Fund specially intended for the Increase of the Society's Library, the Treasurer shall keep a separate Account of the Fund so supported, and shall, from Time to Time, report the Amount thereof in his Hands to the Council, who are to give such Directions as they may judge proper relative to the Purchase of Books.

V. The Treasurer shall have and keep a Yearly List of all such Fellows of the Society as shall have paid the Sum appointed in lieu of Annual Contributions; and also of those who pay the Annual Contributions whether of One or Two Guineas; and in this List shall be noted the Times up to which the Annual Contributions shall have been paid, and the Arrears due from each Fellow respectively.

VI. The Treasurer shall also have and keep a Book of printed Check-Receipts for Annual Contributions; each Receipt to be signed by himself, and to be filled up with the Name of the Fellow paying, the Sum paid, and the Time paid to: these Receipts to be undersigned by the Person who shall receive the

Money

Money on the Treasurer's behalf, who, upon the Delivery of the Receipt to the Fellow paying, is to enter upon that Part of the Check which shall be left in the Book the above Particulars, and also the Day of Payment.

VII. The Treasurer shall demand the Annual Contributions, or cause them to be demanded, of such Persons as shall neglect to make their Payments for Six Months after they become due.

VIII. The Accounts of the Treasurer shall be audited annually, a short Time preceding the Anniversary Meeting, by a Committee consisting of Five Members of the Council, of whom the President and the Secretary to be Two, and of Three Fellows of the Society not Members of the Council, who are to be nominated by the President and approved by the Majority of the Fellows present, such Approval to be determined by Ballot at One of the Two next preceding General Meetings; any Three or more of the said Five Members of the Council, whereof the President and Secretary shall be Two, together with any Two or more of the said Three Fellows, to be a Quorum of the said Committee. The Members of the said Committee who may be of the Council shall make their Report to the Council which shall be held next after such Audit, on or before the Day of the Anniversary Elections; and shall, together with the Members of the said Committee who may not be of the Council, make their Report to the Society upon the Day of the Anniversary Meeting, stating not only the Balance in the Treasurer's Hands, but also the general State of the Funds of the Society.

IX. The Treasurer shall take care that all Writings relating to the Society's Funds and Property, the Bonds given by the Fellows, the Policies of Insurance, and other Securities, be lodged in the Society's Iron Chest.

CHAPTER

CHAPTER XI.

Of the Secretary.

SECT. I. The Secretary shall have Inspection over the Clerk; and shall give the necessary Orders and Directions concerning the entering and writing of all Minutes or Matters in the Minute-Books of the Society or Council, or any other Books of the Society; also concerning any Orders or other Writings for the Use and Service of the Society.

II. The Secretary shall attend at all Meetings of the Society, Council, and Committees; where, when the President shall have taken the Chair, he shall read the Minutes, Orders, and Entries, of the preceding Meeting; and shall afterwards take Minutes of the Business and Orders of the present Meeting, to be entered by the Clerk in the respective Books to which they may relate. He shall also read the Letters and Papers presented to the Society in the Order of Time in which they shall have been received, if the President should so direct.

III. The Secretary shall draw up all Letters to be written to any Persons in the Name of the Society or Council (to be read and approved of in some Meeting of either respectively), except, for some particular Cause or Consideration, some other Person be appointed by the Society or Council to draw up any such Letter. He shall likewise have the Charge, under the Direction of the Council, of printing the Transactions of the Society, and of correcting the Press.

CHAPTER XII.

Of the Clerk, Librarian, and Housekeeper.

SECT. I. The Person who shall be chosen to any one or to all of these Offices, to which Salaries or Emoluments are to be annexed, shall either not be a Fellow of the Society; or, if a Fellow, shall cease to be so, upon his Election to, and Acceptance of, any such Office; as no Fellow of the Society is, or shall be, capable of holding any Place, Office, or Appointment under the Society, to which any Salary, Profit, or Emolument, is or shall be annexed.

II. He shall be competently skilled in Languages and Natural Knowledge, and able to write a fair and legible Hand.

III. The Election of a Person or Persons, to fill one or all of the Situations above mentioned, shall be by the Fellows, in the following Manner: viz. The Names of the several Candidates, if more than one, shall be printed, and delivered to every Fellow attending the Election; each of whom shall take off the Name of such Candidate as he may desire to vote for, and (after having had his own Name marked in a List of the Fellows of the Society by the Secretary, assisted by Two Scrutators, to be appointed in the same Manner as at the Anniversary Elections) shall deliver the Name of the Candidate so taken off, and folded up, into the Hands of the President, who, in the Presence of the Society, shall put the several Names into a Vessel appropriated for that Purpose; and the Candidate who shall be found to have the Majority of Votes, shall be deemed duly elected.

IV. The Person, or Persons, who may be appointed to any, or all of the said Offices, shall be paid such Salary and Allowances

as

as the Council may judge reasonable; and shall not, under Pain of Dismissal, receive any Perquisite or Profit whatever, arising from his or their Connection with the Society, excepting that which shall be expressly allowed by the Council.

V. The Clerk, Librarian, and Housekeeper, shall be subject to such Rules and Orders as shall, from Time to Time, be given to him or them by the President and Council, besides those annexed to the several Offices, as stated in the following Sections; and shall constantly be in Attendance, during all Meetings of the Society, Council, and Committees.

VI. The Clerk, under the Direction of the Secretary, shall enter all the Minutes into the several fair Minute-Books, and shall have the Care of the Writing of all Summonses of the Society, Council, and Committees.

VII. The Clerk shall also, under the Direction of the Secretary, have the Charge and Custody of the Charter and Bye-Law-Book, Minute-Books of the Society and Council, Register-Books and Letter-Books; as also of all Papers and Writings belonging to the Society: all which shall be kept in the House of the Society, that they may be in readiness to be produced at any Meetings of the Society or Council, as the Case shall require, or as shall be ordered by the Society, Council, or President.

VIII. The Clerk shall not suffer any Person, not being a Fellow of the Society, to read any Minute-Book, Record, or Writing, or any Part thereof, belonging to the Society; nor give any Copy thereof, nor in any way communicate any thing contained therein, to any such Person.

IX. He shall, as Deputy to the Treasurer, receive the Payments of the Fellows, pay such Bills as he shall be directed to discharge, pay to the Treasurer the Balance in his Hands whenever he shall be called upon, and keep a fair Account of the Society's Income and Expense.

X. He shall also receive from the Printer all the Copies of the Transactions of the Society; deliver out one Copy to each Fellow, not being in Arrear, who shall ask, or send for it to the House of the Society; furnish the Booksellers with the Copies ordered to be sold; and keep a regular Account of the Transactions so received and delivered.

XI. The Librarian shall attend on such Days, and at such Hours, in every Week, as the Council shall direct, for the Accommodation of such Fellows, or other Members of the Society, as shall desire to consult any of the Books in the Society's Library, and of any other Persons who shall bring a written Authority from any Member of the Council, or who shall be introduced by a Fellow in Person.

XII. The Librarian shall enter into a Catalogue all Books, presented to, or bought by the Society, immediately after their coming into the Possession of the Society, and so place them as that they may be readily found.

XIII. The Librarian shall also have the Charge of the Society's Museum of Natural History; to view which he is to admit the Members of the Society, and such other Persons as shall be introduced by Fellows, at such Times as the Council shall direct. He shall not, without Leave of the Council, permit any Article whatever to be taken out of the Society's Collection, and he shall enter into a Catalogue all Articles presented to, or bought by the Society.

XIV. The Housekeeper shall be always ready to receive Messages, Parcels, Letters, &c. directed to the Society, Council, and Officers; and to cause all Orders, Summonses, and Letters, of the President, Council, and Committees, to be sent or delivered, as directed, in proper Time.

XV. He shall take care that the Society's House, and particularly

cularly the Meeting-Room, and other public Apartments, be kept clean; and that all Conveniencies, with Fires and Candles in the proper Rooms, be prepared and lighted at the Times necessary; and that Paper, Pens and Ink be in constant readiness for Use in every Department: and shall inform the Council, from Time to Time, of whatsoever Repairs he may conceive to be wanting.

XVI. He shall have the Care of the Keys of all the Apartments belonging to the Society, as well for their cleaning and repairing, as for securing their Contents, as much as possible, in the case of Fire or other Accident.

XVII. He shall also carry about the Balloting-Box, at all Meetings, when the President or Chairman shall so direct.

CHAPTER XIII.

Of the General or Ordinary Meetings of the Society.

Sect. I. The General or Ordinary Meetings of the Society shall be held on the Third Tuesday in January, the First and Third Tuesdays in February, March and April, the First Tuesday in May, and on the First and Third Tuesdays in June, November and December, to begin at Eight o'Clock in the Evening, and to continue about an Hour, at the Discretion of the President; but there shall be no Meetings of the Society in the Months of July, August, September and October, nor on the First Tuesday in the Month of January.

II. The Honorary Members, Foreign Members and Associates, shall have free Communication with the Society at their General Meetings.

III. Each Fellow, Honorary Member, Foreign Member and

Associate,

Associate, may introduce a Stranger at every General Meeting of the Society, on delivering his Name to the President; and the Name of every Stranger so introduced shall be entered in the Minute-Book, together with the Name of the Member who shall introduce him, and who is to be accountable for his Conduct during his Presence at the Meeting.

IV. In case of the Absence of the President, the Senior Vice-President then present, shall preside at every General Meeting; and if neither the President, nor any one of the Vice-Presidents, be present, then the Chair shall be taken by the Senior Member of the Council who may be present.

V. When the Chair shall have been taken, all the Members, and other Persons present, shall place themselves orderly, and conveniently, for the Business of the Meeting; the Minutes of the preceding Meeting shall be immediately read, and be signed by the Chairman of the Meeting, and the Presents on the Table shall be declared.

VI. The Business of the Society in their General Meetings shall be, to read and hear Letters, Reports and other Papers, on Subjects of Natural History; and also to view such Specimens of the Productions of Nature as shall be presented.

VII. When any Fellow shall desire to speak, he is to address his Speech to the President or Chairman, who, if Two or more offer to speak together, shall determine which of them shall be heard first.

VIII. In order that the Meetings of the Society may not be wasted by unprofitable Debates, it is ordained, that when any Question, not relating to Elections or the Bye-Laws of the Society, shall be proposed to be balloted for by the Fellows, it shall be fairly transcribed on Paper, and being signed by Six or more Fellows, it shall be by them delivered to the Secretary at a Meeting of the Society; and shall thereupon be read immediately after-

after the Declaration of the Presents on the Table; and, after having been marked by the Secretary with the Date of the Day when delivered, it shall be fixed up in the Common Meeting-Room of the Society at the next Ordinary Meeting; and, on the Meeting next following, it shall be put to the Ballot, unless those who shall have signed it agree to withdraw it.

IX. Whenever, at a General Meeting, the Votes, for and against a Question proposed, shall be found to be equal, in case the Question do not relate to an Election, or other Matter particularly provided for in this respect by the Charter or Bye-Laws, the President, Vice-President or Member of the Council in the Chair, shall have a double Vote.

X. Should any Business of Science, which may require particular Attention, come before the Society, the President or Vice-President in the Chair shall nominate One or more Persons to execute the same; and all Business so executed shall be reported at the first convenient Meeting of the Society.

XI. The Minutes of the Proceedings at each General Meeting shall be entered in a Book, and be publickly signed by the President, Vice-President or Member of the Council in the Chair, before the Meeting shall be dissolved.

CHAPTER XIV.

Of the Meetings of the Council.

Sect. I. The Council shall meet at such Times as shall be appointed by the President, or, in his Absence, by one of the Vice-Presidents; due and sufficient Notice of each Meeting being previously sent to every Member of the Council.

II. The

X. Whensoever it shall appear by the Ballot to be the Sense of the Committee, that any Paper should be made public in the Transactions of the Society, an Entry thereof shall be made in the Minute-Book of the said Committee.

XI. The Minutes of the Transactions at each Meeting of the Council, shall be signed by the President, or Vice-President in the Chair, before the Meeting shall be dissolved.

CHAPTER XV.

Of the Manner of Publication of the Papers laid before the Society.

Sect. I. The Transactions of the Society shall be printed at such Times, and in such Manner, as the Council for the Time being shall direct, at the sole Charge, and for the sole Use and Benefit of the Society.

II. Every Fellow, whose Payments to the Society shall have been paid up to the Time of Publication of each Volume of the Society's Transactions, shall be entitled to One Copy of such Volume; but no Fellow who shall not have paid the Sum appointed in lieu of all Annual Payments, or paid at least One Yearly Contribution at the Time of Publication, shall be considered as entitled thereto.

III. A Number of Copies, at least sufficient to supply the Fellows of the Society, shall be delivered to the Clerk of the Society, who shall enter in a Book, to be provided for that Purpose, the Number of Copies received by him, for which he shall be accountable to the Council for the Time being.

IV. The Clerk shall deliver, gratis, at the Society's House, One of the said Copies to every Fellow of the Society who shall demand the same, either in Person, or by Letter or other Writing

under

under the Hand of such Fellow as shall not come in Person to make such Demand: and the Person so receiving a Copy of such Transactions, shall, at the same Time, sign the abovementioned Book, as having received the said Copy.

V. In order that the Fellows may be apprized of the Time when it will be proper for them to come, or send, for their respective Copies, due and timely Notice shall be given in some one or more of the public Newspapers, of the Day upon which the Clerk will begin to deliver out the said Copies, as aforesaid; which Day shall be fixed and appointed by the Council for the Time being.

VI. The Executor of any deceased Fellow shall not be entitled to receive a Copy of the Transactions published after the Death of such Fellow.

VII. No Fellow of the Society shall receive, or be entitled to receive, gratis, any Copy or Copies of the Transactions, so printed as aforesaid, after Five Years shall have elapsed from the Time of the Clerk's having begun to deliver out such Copies respectively; but his neglecting to demand them for so long a Time, shall be deemed a Forfeiture and Dereliction of his Right thereto, unless the Council for the Time being, upon their being made acquainted with the Reason of, or Excuse for, such Delay, should order the same to be delivered.

CHAPTER XVI.

Of the Books and Papers of the Society.

Sect. I. There shall be had and kept a Book, called the Charter and Bye-Law Book, in which shall be fairly written the

 Copy

Copy of the Charter and Bye-Laws, and also the Obligation to be subscribed by the Fellows of the Society in their own Handwriting.

II. There shall be had and kept a Book, containing the Register of the Fellows of the Society, with the Times of their Election and Admission.

III. There shall be had and kept Minute-Books for the Society and Council; in which shall be entered all the Minutes, Orders, and Business of the Society and Council at their respective Meetings.

IV. No Fellow shall give any Copy, or any Transcript of any Matter contained in the Minutes, or other Books of the Society, to any one not being a Member thereof; nor communicate the same to any such Person to be transcribed, without particular Leave obtained of the Council; except the said Matter should have been originally brought in, or communicated by himself: But any Fellow of the Society may, at proper Times, and in the Society's House, have the Liberty of inspecting any Article in the Minute-Books of the Society.

V. The original Copy of every Paper, after having been read before the Society, shall be considered as the Property of the Society, if there should be no previous Engagement with its Author to the contrary: but any Author may have a Copy of his own Papers by Leave of the Council.

VI. All the Papers which shall have been read before, or communicated to the Society in the Course of each Year, and not withdrawn by Leave of the Council, shall be delivered to the Council, and shall be preserved in Guard-Books, for future Inspection; and shall never be lent out of the Society's House, without an Order of the Council.

CHAPTER

CHAPTER XVII.

Of the Common Seal and Deeds.

Sect. I. The Common Seal of the Society shall be kept in an Iron Chest, having Three Locks, with Three different Keys; of which One shall be in the Custody of the President, another of the Treasurer, and the Third of the Secretary.

II. Every Deed, or Writing, to which the Common Seal is to be affixed, shall be passed, and sealed in Council, and signed by the President, on the fore Part, near the Label, and shall also be signed on the Back, by the rest of the Members of the Council present.

APPENDIX.

No. I.

Form of a Balloting-List for the Council.

A LIST of Persons recommended by the Council of the Linnean Society of London to be removed from, and elected into the said Council, at the Election of May 180 .

Five Members of the present Council recommended to be removed.

A. B.	
C. D.	
E. F.	
G. H.	
I. K.	

Five Fellows recommended to be elected into the Council

L. M.	
N. O.	
P. Q.	
R. S.	
T. U.	

Any Fellow who disapproves of any of the Names recommended above, is requested to strike out with his Pen such Names as he does not approve, and to write opposite to each Name so struck out, the Name of the Person for whom he chooses to give his Vote.

No. II.

No. II.

Form of a Balloting-List for the Officers.

A LIST of the Persons recommended by the Council of the Linnean Society of London, to be appointed to the Offices of President, Treasurer, and Secretary of the Society, at the Election of May 180 .

PRESIDENT B. A.	PRESIDENT
TREASURER D. C.	TREASURER
SECRETARY F. E.	SECRETARY

Any Fellow who disapproves of any of the Names recommended above, is requested to strike out with his Pen such Names as he does not approve, and to write opposite to each Name so struck out, the Name of the Person for whom he chooses to give his Vote.

PATENT

GRANTING AND ASSIGNING

ARMS, CREST, AND SUPPORTERS,

TO

THE LINNEAN SOCIETY OF LONDON.

TO ALL AND SINGULAR to whom these Presents shall come, Sir *Isaac Heard* Knight, Garter Principal King of Arms, *Thomas Lock* Esquire, Clarenceux King of Arms, and *George Harrison* Esquire, Norroy King of Arms, send Greeting: Whereas *Alexander M‘ Leay* Esquire hath by Letter represented unto the Most Noble *Charles* Duke of *Norfolk*, Earl Marshal and Hereditary Marshal of England, that the King's Most Excellent Majesty hath been graciously pleased by his Royal Charter under the Great Seal of the United Kingdom of Great Britain and Ireland, bearing Date the Twenty-sixth Day of March last, to incorporate several of His Subjects into one Body Politic and Corporate, by the Name of "THE LINNEAN SOCIETY OF LONDON," for the Cultivation of the Science of Natural History in all its Branches, and more especially of the Natural History of Great Britain and Ireland; and there being in the said Charter, a Clause, granting perpetual Succession and a Common Seal to the said Society, he therefore, as Secretary to the said Society, requested on the Part of the Council thereof, the Favour of His Grace to issue his Warrant to Garter and the other Kings of Arms

Arms for their devising, granting and assigning such Arms, Crest, and Supporters, as may be proper to be borne by the said Linnean Society of London, on a Common Seal, Shields, Banners, or otherwise, according to the Laws of Arms: And forasmuch as the said Earl Marshal did by Warrant under his Hand and Seal, bearing Date the Seventh Day of December instant, authorize and direct us to devise, grant and assign such Arms and Crest, and that Garter Principal King of Arms do devise, grant and assign such Supporters accordingly; Know ye therefore that We the said Garter, Clarenceux and Norroy, in pursuance of His Grace's Warrant, and by virtue of the Letters Patent of our several Offices, to each of us respectively granted under the Great Seal of Great Britain, have devised, and do by these Presents grant and assign to the said Linnean Society of London the Arms following, that is to say, Per Fess, the Chief per Pale Gules and Vert, the Base Sable; On a Fess Argent, a Hurt, charged with an Egg erect proper: And for the Crest, On a Wreath of the Colours, behind a Mount on which vegetates the Linnæa borealis, the Sun rising in Splendour, all proper; as the same are in the Margin hereof more plainly depicted*. And I the said Garter do hereby grant and assign the Supporters following, that is to say, on the Dexter, a Lion Or, gorged with the Linnæa borealis proper; therefrom a Shield pendant, per Pale Wavy Argent and Ermine, charged with a Rose slipp'd Gules, and a Thistle Fessways proper: And on the Sinister, an Eagle, rising proper, gorged as the Dexter, therefrom a Shield pendant Argent, charged with a Trefoil slipp'd Vert; as also depicted in the Margin hereof: The said Arms, Crest and Supporters, with the Motto "*Naturæ discere Mores,*" to be borne and used for ever hereafter by the said Linnean Society of London, on a

* Vide Title-page.

Common

Common Seal, Shields, Banners, or otherwise, according to the Laws of Arms. In Witness whereof We the said Garter, Clarenceux, and Norroy, Kings of Arms, have to these Presents subscribed our Names, and affixed the Seals of our several Offices, this Thirteenth Day of December in the Forty-third Year of the Reign of our Sovereign Lord George the Third, by the Grace of God, of the United Kingdom of Great Britain and Ireland King, Defender of the Faith, &c. and in the Year of our Lord One thousand eight hundred and two.

ISAAC HEARD, Garter, } (L. S.) { Principal King of Arms.

THOMAS LOCK, Clarenceux, } (L. S.) { King of Arms.

GEORGE HARRISON, Norroy, } (L. S.) { King of Arms.

TRANS-

TRANSACTIONS

OF THE

LINNEAN SOCIETY.

I. *A new Arrangement of the Genus Aloe, with a chronological Sketch of the progressive Knowledge of that Genus, and of other succulent Genera. By Adrian Hardy Haworth, Esq. F.L.S.*

Read December 1, 1801.

THE genus *Aloe* is composed almost entirely of African plants, which are not less remarkable for their succulent and strange-shaped leaves; than for the very stately and magnificent flowers with which the species of the section *Grandifloræ* in the following arrangement, in particular, are annually adorned. It must however be confessed, that there is the least possible variety, either in the natural structure and position of those flowers; or in their colour; which in every species of that section (except *barbadensis*), and in every species of my section *Curvifloræ*, is of a lovely coral hue; often ending in highly softened shades of yellow and green. Dillenius bestows very great praise upon his *Aloe mitræformis:* he says, (*Hort. Elth. p.* 21.) "Inter numerosas, quas Hortus Elthamensis alit, Aloes species, lætissime viget elegans hæc species, et singulis fere annis copiosa florum corona superbit." Towards the close of this account he adds, "Odor floribus nullus, sed color et dispositio elegans, et tota planta venusta."

The species in my section *Parviflorœ* have small unhandsome flowers; those of *A. reticulata*, indeed, may be excepted, which are pretty, and of a rosy-white colour, spangling to the sun; not very distantly resembling those of *Hyacinthus orientalis.* The pearly and odd-constructed forms, however, so frequently found in this division, abundantly compensate for their trifling blossoms. Their beauties are equal to others which are always in bloom.

Bradley, speaking of them in his *Dictionarium Botanicum*, says, "I don't know of any tribe of plants which afford a more pleasing variety than these, for the odd shape of their leaves and manner of spotting, and being some of them covered as it were with pearls."

Yet in spite of all these attractive recommendations and encomia, the whole genus, from a chain of occurrences very difficult to account for, has never been properly investigated or cherished, either by the botanists or horticulturists of our times; consequently, the numerous species which compose it are but little cultivated, and still less understood.

The probable reasons of this are, first, a somewhat natural propensity in several of the species to vary; and secondly, a predominant, but I believe an erroneous, idea, that few of them are truly and originally distinct; but fluctuating and inconstant if raised from seed.

This belief, so far as concerns two species, as likely as any others to vary from seed, I can practically contradict; having myself raised *A. margaritifera minima* and *A. Lingua angustifolia* from seed of my own saving, and found no variation whatever from the mother plants. A cause exists, of greater weight, in my opinion, than both the above mentioned, which prevents the botanist, unless he is likewise an horticulturist, from acquiring a competent knowledge of Aloes, and of all other succulent plants: I

mean

mean the utter impracticability of their ever appearing in a *hortus siccus*; at least in any cognizable shape.

Impressed with these sensations, and a natural early-planted love of the succulent department of botany, and of gardening in all its branches; I have long collected and cultivated, and with unremitting assiduity still continue to collect and cultivate, all the Aloes and other succulent plants which it is possible to procure. Fifteen years ago with ardour I commenced the pleasing task; and the observations I have now the satisfaction of submitting to the Linnean Society, I give as the result of all the experience I have acquired on this subject from that period to the present time.

In the beginning and middle of the late century, when the management of green-house and hot-house plants was in its infancy; when collections of exotics were neither so numerous nor so extensive as at present; not only succulent plants in general, but those of the genus *Aloe* in particular, were held in the highest repute, both in Britain and on the continent, but more especially in Holland.

This arose partly from the smallness of the collections of those times, and partly from the well-known facility with which plants of this description are usually managed and kept. Besides, the strange and impressive forms assumed by them, (so widely different from the other branches of the vegetable kingdom) at those periods, from the circumstance of novelty alone, attracted the attention of botanists and gardeners more than they can now be expected to do. That indeed was the golden age of the succulent plants. In this country, Bradley, by his well known *Decades*; and Dillenius, who with matchless skill exhausted the subject as far as then known; and Miller, by his celebrated *Dictionary*, incorporating with unusual facility all their knowledge with his own, and with

that of Ray, Petiver, and Plukenet; extended the history of succulent plants to a far greater degree than it had before arrived at.

On the continent also, particularly in Holland, the subject had rapidly advanced; and multitudes of species had been collected and cherished, and many of them figured and described by Muntingius, in his *Aloidarium;* by Breynius, Burman, and Boerhaave; by the two Commelines, father and son; and by Volckamer, Tilli, Herman, and others.

Yet, notwithstanding the force of such bright examples as these, the whole subject, for more than half a century, has not by any means kept pace with the other departments of botany, but has been almost entirely neglected; no work on succulent plants, exclusively, having appeared during all that time, nor any other publication which has much advanced our knowledge of them, except, indeed, the *Hortus Kewensis* of the late Mr. Aiton, and my own *Observations on the Genus Mesembryanthemum*; in which, after regretting my inability to figure the numerous species of that genus, I recollect expressing an anxious wish, that some other person more able than myself would take up the business, and do so.

At length I have the happiness to say, that this wish has been more than complied with in France, by the authors of a periodical work now publishing in Paris under the title of *Plantes Grasses,* who appear to have undertaken the figuring not only of this my favourite genus, but of all other succulent genera. An impartial account of some errors attending those figures and their accompanying descriptions I have already had the honour of laying before the Linnean Society.

I shall conclude this preface with observing, that the Aloes, like all other intricate or extensive families of plants, require sections and subdivisions to render the investigation of their component

nent species certain and easy; and although this has not hitherto been attempted by any one, yet it is much to be wondered that it has not, from the uniformity so remarkable in the structure of their flowers. This I have noticed above; and it did not completely escape the keen eye of Linnæus, although he did not make that use of it which I am about to do. What are sections in my arrangement were little more than species with him. Speaking of his *Aloe pumila*, which includes three species and two varieties, he says, " Flores, in hoc genere certissimi indices, conjungunt *margaritiferam* et *arachnoideam*."

The extensive value of this decisive criterion, as important for a section as it is fallacious for a species, I with pleasure beheld in the living plants, long before I ever saw the remark itself.

On this natural and obvious principle all my sections and subdivisions are founded; and I have the satisfaction of asserting, that they are at once absolute and easy; which all good sections ought to be. Otherwise, instead of facilitating that examination they are intended for, they have an evident tendency to perplex and obstruct it.

That this paper, already too long, may not be further swelled in an unnecessary manner, I shall avoid detailed descriptions, and give but a few synonyma to each described species and variety; but they shall be the best in my possession, and all very carefully examined.

The species and varieties which I have not referred to Professor Willdenow's edition of *Species Plantarum*, now publishing, are not enumerated in that work; and those which have not hitherto had specific names I have marked with an asterisk.

All the species and varieties which I have described are at this present time alive in my own collection, except only *A. aspera* and *striata*, and those of the Appendix. For several of the new sorts, and

and for much valuable and liberal information concerning the old ones, I am under great obligations to my good and much respected friend Mr. Aiton, of Kew, to whom my best thanks and best wishes, on this occasion, are but a trifling and inadequate reward.

The *loci natales*, or *habitats* as they are usually, but perhaps inaccurately called, of the new species, and the names of their introducers into the British gardens, I have carefully given, under their proper heads, as far as I am acquainted with them.

Little Chelsea,
November 1801.

SYNOPSIS SPECIERUM.

ALOË.

* Parviflorae. *Corollis plerumque virescentibus, laciniis sæpius revolutis.*
† Rigidæ, *plerumque caulescentes, foliis rigidissimis integris.*

viscosa. Aloe foliis trifariis ovatis acutis perviridibus minime tuberculatis, caule stricto.
1

A. viscosa. *Willd. Sp. Pl.* 2. 191. excluso synonymo et icone *Tillii.*

A. africana erecta triangularis et viscosa. *Comm. Præl. f.* 31.

A. africana, &c. *Dill. Elth. t.* 13. *f.* 13.

A. viscosa. *Plantes Grasses, p.* 16, *cum icone.*

**aspera.* Aloe foliis trifariis orbiculato-ovatis acuminatis viridibus; supra subconcavis; subtus valde tuberculatis, caule stricto.
2

Habitat ad Cap. Bon. Sp. *D. Masson.*

Obs. This species is of difficult culture, and probably will not long remain alive in Europe.

* *foliolosa.* 3 Aloe foliis multifariis brevissimis orbiculato-ovatis lævigatis horizontalibus læte-viridibus, caule stricto.

Habitat ad Cap. Bon. Sp. *D. Masson.*

Obs. This is the least-leaved of all the Aloes; the leaves are at the same time the thinnest, the most numerous, and most crowded.

imbricata. 4 Aloe foliis multifariis erectiusculis lævigatis immaculatis, caule stricto.

A. spiralis α. imbricata. *Willd. Sp. Pl.* 2. 191. *Ait. Kew.* 1. 471.

A. africana erecta rotunda, folio acuminato. *Comm. Præl. t.* 32.

A. africana, &c. *Dill. Elth. t.* 13. *f.* 14.

A. spiralis. *Plantes Grasses, p.* 55, *cum icone.*

* *tortuosa.* 5 Aloe foliis spiraliter trifariis patulis nigricantibus; externe minime tuberculatis, caule valde tortuoso.

Habitat ad Cap. Bon. Sp. *D. Lewis.*

pentagona. 6 Aloe foliis quinquefariis patentibus glabris viridibus; subtus obsolete maculatis, caule rectiusculo rarissime subtortuoso.

A. spiralis β. pentagona. *Willd. Sp. Pl.* 2. 191. *Ait. Kew.* 1. 471.

* *spiralis.* 7 Aloe foliis spiraliter quinquefariis patentibus glabris viridibus; subtus obsolete maculatis, caule valde tortuoso.

Obs. This species has not yet been in any collection but my own: it is very much like *A. pentagona*, but somewhat larger: the plant is so much twisted as to make the position of the leaves seem multifarious: in *pentagona* they are usually in five regular angles.

* *expansa.*

* *expansa.* Aloe subacaulis, foliis multifariis viridibus immaculatis; junioribus patulis; senioribus horizontalibus rugosiusculis.
8

Obs. This species is exceedingly like the *Aloe rigida* of the *Plantes Grasses, p.* 62; yet I can hardly suppose they are the same: the leaves of *rigida* seem more erect.

* major. β. paulo major.

Habitat ad Cap. Bon. Sp. *D. Malcolm.*

* *albicans.* Aloe acaulis, foliis multifariis lævigatis mucronatis albicantibus: marginibus carinaque cartilagineis.
9

A. africana humilis, folio triangulari rigido albicante. *Comm. Præl. t.* 30.

A. africana folio glabro et rigidissimo flore subviridi. *Comm. Hort. Amst. pars altera, t.* 7?

Habitat ad Cap. Bon. Sp. *D. Masson.*

Obs. This is the largest-leaved species, and by far the finest of this section: its stemless habit approximates it to the next subdivision; from which, however, it is excluded by the extreme rigidity of its leaves.

†† Acaules, *foliis mollioribus integris radicalibus.*

* *cymbiformis.* Aloe foliis multifariis cymbiformibus obtusis mucronatis glaucis; supra valde concavis: apicibus carinatis obsolete reticulatis.
10

Habitat ad Cap. Bon. Sp. *D. Masson.*

Obs. This odd species has very much the air of a *Sempervivum;* its excavated leaves communicate a strange appearance to it: it produces offsets amazingly.

* *reticulata.*

* *reticulata.* Aloe foliis multifariis æquilateri-triquetris obtu-
11 siusculis glaucescentibus reticulatis; supra subconcavis.

Obs. This is a pretty species, and perhaps the smallest of all: its appearance, as well as size, very much resembles the lesser species of *Sempervivum.*

retusa. Aloe foliis quinquefariis retuso-deltoideis pallide
12 viridibus; apice perviridibus; supra lineatis.

A. retusa. *Willd. Sp. Pl.* 2. 191. *Plantes Grasses, p.* 45, *cum icone. Curt. Bot. Mag.* 455.

A. africana, brevissimo crassissimoque folio, flore subviridi. *Comm. Hort. Amst.* 2. *t.* 6.

A. africana, brevissimo crassissimoque folio, flore candido. *Till. Pis. t.* 5.

Obs. There is an icon of this very odd species without flowers in the frontispiece to *Blair's Botanic Essays*, between the two Stapelias.

††† Ciliatæ, *foliis ciliato-spinosis radicalibus.*

* *mirabilis.* Aloe foliis quinquefariis retuso-deltoideis cuspida-
13 tis: marginibus carinaque ciliato-spinosis; supra glabriusculis; subtus subtuberculatis obsolete reticulatis.

Habitat ad Cap. Bon. Sp. *D. Masson.*

Obs. This and *A. cymbiformis* are two extremely singular species; and such, had they been figured in the dark ages of botany, as we should have fancied more like the productions of art than the genuine children of nature: *A. mirabilis* is a connecting, but very abrupt link, between the remote species *retusa* and *pumila.*

pumila. ALOE foliis multifariis perviridibus: spinis herbaceis
14 tuberculisque numerosis.

A. arachnoides β. pumila. *Willd. Sp. Pl.* 2. 188.

A. atrovirens. *Plantes Grasses, p.* 51, *cum icone.*

A. africana minima atroviridis spinis herbaceis numerosis ornata. *Boerh. Ind. Alt.* 2. 131. *t.* 131.

Obs. This species produces offsets prodigiously, and soon forms very convex, compact, and circular tufts.

* *translucens.* ALOE prolifera, foliis multifariis lanceolatis tere-
15 tiusculis eleganter ciliatis; apice maculis oblongis valde pellucidis.

Habitat ad Cap. Bon. Sp. *D. Masson.*

Obs. This species is very much like the next; but differs, in constantly producing numerous offsets, in being smaller, having finer ciliæ, being much more pellucid, and having no cartilaginous substance on the margins of its leaves. It is an elegant species.

arachnoides. ALOE foliis multifariis lanceolatis; supra planiusculis
16 grosse ciliatis: marginibus cartilagineis.

A. arachnoides α. communis. *Willd. Sp. Pl.* 2. 188.

A. humilis africana, arachnoidea. *Comm. Præl. t.* 27.

A. arachnoides. *Plantes Grasses, p.* 50, *cum icone.*

Obs. This species very rarely produces any offsets.

†††† Margaritaceæ. *Acaules, foliis multifariis margaritaceo-tuberculatis.*

* *recurva.* ALOE foliis subulatis recurvatis; supra concavis; sub-
17 tus sub-tuberculatis: marginibus margaritaceo-tuberculatis.

Habitat

Habitat ad Cap. Bon. Sp. *D. Masson.*

Obs. This is a very singular species, and has not a very distant affinity to the rigid section; but clearly belongs to this.

** attenuata.* ALOE foliis subulatis elongatis; subtus tuberculis
18 margaritaceis majoribus; supra minutissimis, capsulis oblongis triquetris.

A. africana margaritifera minor, foliis multo longioribus. *Boerh. Ind. Alt.* 2. 130. *no.* 27.

margaritifera. ALOE foliis multifariis undique sparsis tuberculis
19 magnis margaritaceis, capsulis sphæroideo-oblongis triquetris.

* maxima. A. africana folio in summitate triangulari margaritifera, flore subviridi. *Hort. Amst.* 2. *f.* 10. *Comm. Præl.* 43. *Boerh. Ind. Alt.* 2. 130. *no.* 29.

major. A. margaritifera α. major. *Willd. Sp. Pl.* 2. 188. (excluso synonymo *Commelini.*) *Ait. Kew.* 1. 468. *Plantes Grasses, p.* 57, *cum icone.* (excluso synonymo *Commelini,* quæ ad varietatem maximam pertinet.) *Brad. Succ. t.* 21. (excluso synonymo *Boerhaavii,* quæ ad varietatem maximam pertinet.)

A. africana eadem (29) folio undique verrucis numerosissimis ornato. *Boerh. Ind. Alt.* 2. 131. *no.* 30.

minor. A. margaritifera β. minor. *Willd. Sp. Pl.* 2. 188. (excluso synonymo *Commelini,* quæ ad varietatem majorem pertinet.) *Ait. Kew.* 1. 468.

A. africana margaritifera minor. *Dill. Elth.* 19. *t.* 16.

t. 16. *f.* 17. *Comm. Hort. Amst.* 2. 21. *f.* 11. *Boerh. Ind. Alt.* 2. 130. *no.* 26.

minima. A. margaritifera γ. minima. *Willd. Sp. Pl.* 2. 189. *Ait. Kew.* 1. 468.

A. africana margaritifera minima. *Comm. Præl.* 43. *Dill. Elth. t.* 16. *f.* 18.

Aloes ejusdem (29, 30.) varietas multiplex nata ex diversitate figuræ, magnitudinis verrucarum distinctis coloribus nitentium. *Boerh. Ind. Alt.* 2. 131. *no.* 31. Icon at the lower right-hand corner of the frontispiece to *Blair's Bot. Essays.*

** CURVIFLORÆ. *Corollis ob-clavatis curvatis, corallii colore, apicibus virescentibus.*

† Bifariæ. *Acaules, foliis plerumque bifariis.*

verrucosa. 20 ALOE foliis bifariis ensiformibus acutis perviridibus supra concavis: undique tuberculis margaritaceis numerosissimis sparsis.

A. verrucosa. *Willd. Sp. Pl.* 2. 189. (excluso synonymo *Commelini.*) *Ait. Kew.* 1. 468. *Mill. Dic. ed.* 8. *no.* 20.

A. africana floribus rubris tenuissimis pediculis folio plano margaritifera. *Till. Pis. t.* 8.

A. carinata. *Plantes Grasses, p.* 63, *cum icone.*

verrucosa v. intermedia J. Linn. Soc. xviii. 184

* *intermedia.* 21 ALOE foliis bifariis subensiformibus læte viridibus: tuberculis numerosissimis albicantibus sparsis.

A. africana foliis planis conjugatis carinatis verrucosis, caule et flore corallii colore. *Boerh. Ind. Alt.* 131. *cum fig.?*

A. ramosa flore rubro, folio maculis ab utraque parte ex albo-viridi notato. *Till. Pis. t.* 9.

Obs. This is an intermediate plant between *A. verrucosa* and *A. Lingua angustifolia.*

Lingua.

Lingua. 22 — Aloe foliis plerumque bifariis linguæformibus obtusis lævibus undique maculatis: marginibus cartilagineis obsolete serrulatis.

angustifolia. — A. foliis angustioribus.
A. linguiformis verrucosa. *Plantes Grasses, p.* 68, *cum icone.* (exclusis synonymis *Boerhaavii* et *Milleri*, quæ ad *A. intermediam* et *A. verrucosam* nobis pertinent.)

* latifolia. — A. foliis latioribus.
A. linguiformis angustifolia. *Plantes Grasses, p.* 68, *cum icone. Martyn Rar.* 11. *cum fig.* (excluso synonymo *Boerhaavii.*)

* longifolia. — A. foliis longioribus.
A. africana flore rubro, folio maculis ab utraque parte albicantibus notato. *Comm. Hort. Amst.* 2. 15. *f.* 8.

* angulata. — A. foliis bifariis vel oblique bifariis sæpius angulatis late linguæformibus.
A. africana flore rubro, folio triangulari et verrucis ab utraque parte albicantibus notato. *Comm. Hort. Amst.* 2. 17. *t.* 9. ?

* multifaria. — A. foliis sæpius spiraliter-multifariis.

* *nigricans.* 23 — Aloe foliis imbricatis bifariis late linguæformibus obtusissimis nigricantibus lævigatis obsolete maculatis: marginibus integerrimis.
A. Lingua crassifolia. *Willd. Sp. Pl.* 2. 190.
A. Lingua crassifolia, foliis latioribus brevioribus. *Ait. Kew.* 2. 469.

carinata. 24 — Aloe foliis multifariis acinaciformibus valde tuberculatis.
A. carinata. *Willd. Sp. Pl.* 2. 189. (excluso synonymo *Martyni.*) *Ait. Kew.* 1. 469. *Mill. Dic. ed.* 8. *no.* 21.

5 A. africana

A. africana sessilis, foliis carinatis verrucosis. *Dill. Elth. t.* 18. *fig. optima.*

— glabra — * subglabra. β. tuberculis fere obliteratis.

†† Pictæ. *Caulescentes foliis pictis, caule tortuoso.*

pulchra — *pulchra.* 25 Aloe foliis ensiformibus acutis.
A. maculata pulchra. *Willd. Sp. Pl.* 2. 189. *Ait. Kew.* 1. 469.

obliqua. 26 Aloe foliis anguste-linguæformibus obtusissimis cum mucrone.
— maculata, Baker J. Linn. Soc. XVIII 191 A. maculata obliqua. *Willd. Sp. Pl.* 2. 189. *Ait. Kew.* 1. 469.

*** Grandifloræ. *Corollis cylindraceo-ovatis, corallii colore, apicibus virescentibus.*

† Anomalæ, *foliis bi- vel tri-fariis integris.*

variegata. 27 Aloe foliis trifariis pictis.
α. stylo staminibusque corolla brevioribus, fasciis viridibus foliorum angustioribus.
β. stylo staminibusque corolla longioribus, fasciis viridibus latioribus.
A. variegata. *Willd. Sp. Pl.* 2. 190. (excluso synonymo *Tillii.*) *Ait. Kew.* 1. 470. *Curt. Bot. Mag. f.* 513. *Plantes Grasses, p.* 21, *cum icone.* (excluso synonymo *Tillii.*)
A. africana humilis, folio ex albo et viridi variegato. *Comm. Præl. t.* 28. Icon, the middle one, at the bottom of the frontispiece to *Blair's Botanic Essays.*

Obs. Perhaps this species and the two last are the most beautiful of all the Aloes. This has a

 creeping

creeping root, and has not one species nearly allied to it in all the genus.

plicatilis. ALOE foliis bifariis glaucis, caule fruticoso dichotomo.
28

A. plicatilis. *Willd. Sp. Pl.* 2. 190. *Ait. Kew.* 1. 470. *Curt. Bot. Mag. f.* 457.

A. africana arborescens montana non spinosa, folio longissimo plicatili, flore rubro. *Comm. Hort.* 2. *p.* 5. *t.* 3.

A. caulescens palmæ facie. *Pet. Gaz. Cat.* 467. *t.* 89. *f.* 3. *mala.*

Obs. This is the most branched and thickest-stemmed of all: in the habit of its bifarious leaves it resembles the species of the last section, but the structure of the flowers unerringly refers it to the present one.

†† Acaules, *foliis multifariis ciliato-dentatis radicalibus.*

humilis. ALOE foliis subulatis supra turgidis undique inerme tuberculato-spinosis.
29

α. foliis supra turgidis inerme spinosis; infra tuberculatis; apicibus rectiusculis, bracteis internodio longioribus, stylo staminibus breviore.

A. humilis α. *Willd. Sp. Pl.* 2. 187.

A. humilis. *Plantes Grasses, p.* 39, *cum icone.*

A. perfoliata ξ. humilis. *Ait. Kew.* 1. 467.

A. africana humilis, spinis inermibus et verrucis obsita. *Comm. Præl.* 77. *t.* 26. *Till. Pis. t.* 6. *mala.*

* incurva. β. foliis subulatis teretiusculis undique valde tuberculatis: apicibus incurvatis, bracteis internodio brevioribus, stylo staminibus longiore.

* *tuberculata.*

* *tuberculata.* 30 ALOE foliis acuminatis; supra concaviusculis; undique numerosissime tuberculatis.

suberecta. 31 ALOE foliis acuminatis; supra planis lævibus; subtus tuberculatis.

α. foliis glaucescentibus; subtus valde tuberculatis.

A. perfoliata suberecta, foliis planis suberectis: marginibus et pagina inferiore spinosis. *Ait. Kew.* 1. 467.

* β. foliis glaucis supra lævibus; subtus versus apicem tuberculatis.

††† Subacaules, *foliis multifariis ciliato-spinosis, propaginibus radicalibus.*

* *prolifera.* 32 ALOE foliis lanceolatis acutis glaucis: marginibus carinaque apice spinosis vix cartilagineis; subtus subtuberculatis.

A. perfoliata δ. africana caulescens, foliis glaucis brevissimis, foliorum summitate interna et externa nonnihil spinosa. *Willd. Sp. Pl.* 2. 185. *Comm. Præl. t.* 22.

A. brevioribus. *Mill. Dic. no.* 8.

Obs. This is the most abundant producer of offsets in this section.

depressa. 33 ALOE foliis oblongo-ovatis acutis glaucis; subtus tuberculatis: marginibus carinaque apice cartilagineis dentatis.

A. perfoliata ζ. africana caulescens, foliis glaucis brevioribus: foliorum parte interna et externa nonnihil spinosa. *Willd. Sp. Pl.* 2. 186. (exclusis synonymis *Comm. Hort.* 2. *t.* 14. *et Mill. Dic. no.* 3.) *Comm. Præl.* 71. *t.* 21.

A. perfoliata.

A. perfoliata depressa. *Ait. Kew.* 1. 467. (excluso synonymo *Milleri.*)

A. glauca. *Mill. Dic. No.* 16.

Obs. This species was well named by Aiton: it is clearly the most depressed of all the genus. Like the last, it is also an abundant producer of offsets.

* *virens.* 34 Aloe foliis oblongo-lanceolatis viridibus; subtus maculatis: marginibus remote spinosis; spinis viridibus, floribus thyrso-spicatis.

†††† Suffrutescentes, *foliis multifariis, dentato- vel denticulato-spinosis.*

+ *Propaginibus radicalibus.*

saponaria. 35 Aloe foliis oblongo-ovatis acutis valde maculatis: spinis rubro-fulvis.

minor. A. foliis lanceolato-oblongis virescentibus: maculis majoribus validioribus subfasciatis; spinis rubris, floribus thyrso-capitatis.

A. picta β. minor. *Willd. Sp. Pl.* 2. 187.

A. perfoliata saponaria. *Ait. Kew.* 1. 467.

A. disticha. *Mill. Dic. No.* 5.

A. africana maculata spinosa minor. *Dill. Elth. t.* 14. *Till. Pis. t.* 10. *mala.*

obscura. A. foliis ovato-ellipticis glaucescentibus: maculis minoribus et obsoletioribus sparsis; spinis ruberrimis, floribus thyrso-spicatis.

A. picta α. major. *Willd. Sp. Pl.* 2. 186.

A. perfoliata obscura, foliis latioribus amplexicaulibus maculatis margine spinosis, floribus spicatis. *Ait. Kew.* 1. 467.

A. obscura. *Mill. Dic. No.* 6.

A. africana caulescens foliis spinosis maculis ab utraque parte albicantibus notatis. *Hort. Amst.* 2. *f.* 5.

A. africana maculata spinosa major. *Dill. Elth. t.* 15.

A. africana caulescens foliis caulem amplectentibus, floribus aurantiacis. *Brad. Succ. dec.* 4. *p.* 11. *cum icone.*

* latifolia. A. foliis ovatis acuminatis: maculis valde obscuris sparsis; spinis rufescentibus, floribus thyrso-capitatis.

Obs. This variety and *Aloe striata* have the broadest leaves of all the Aloes.

serrulata. 36 ALOE foliis maculatis: marginibus carinaque apice serrulatis.

A. perfoliata serrulata. *Ait. Kew.* 1. 467.

Obs. This and the two next species very seldom produce any offsets.

** striata.* 37 ALOE foliis glaucis substriatis: marginibus obsoletissime denticulatis.

Habitat ad Cap. Bon. Sp. *D. Masson.*

Obs. This and the last species have the least marginal spines of the whole section.

lineata. 38 ALOE foliis viridibus lineatis: spinis rubris.

A. perfoliata lineata. *Ait. Kew.* 1. 467.

Obs. This is the greenest-leaved of all this section. There is only one plant of it alive in Britain.

glauca. 39 ALOE foliis valde glaucis: spinis rubris.

α. foliis dealbatis: spinis junioribus pallidioribus adscendentibus.

A. perfoliata

A. perfoliata glauca. *Ait. Kew.* 1. 466. (excluso synonymo *Milleri.*)

A. africana foliis glaucis margine et dorsi parte superiore spinosis. *Hort. Amst.* 2. *f.* 12. *Comm. Præl.* 75. *f.* 24.

* β. foliis cærulescenti-glaucis subtus versus apicem subtuberculatis: spinis junioribus virescentibus respicientibus.

barbadensis. 40 Aloe foliis ensiformibus sinuato-serratis, corollis luteis.

A. barbadensis. *Mill. Dic. No.* 2.

A. perfoliata barbadensis. *Ait. Kew.* 1. 466.

A. vulgaris. *Plantes Grasses, p.* 27. *cum icone.*

A. vera vulgaris. *Munting. Aloidar. cum icone.*

Obs. This species and *striata* are the softest-leaved and most succulent of all the Aloes: the former is the only species whose flowers are yellow. In the course of my studying this genus, I have found the *structure* and *colour* of the flowers, and the *position* and *colour* of the leaves, tubercles, and spines, of more consequence, as specific criteria, than the *shapes* of those leaves, arms, or flowers.

✛ ✛ *Dichotomæ, propaginibus caulinis, caule senecto percrasso dichotomo.*

soccotrina. 41 Aloe foliis ensiformibus virescentibus: apicibus subincurvatis; serraturis marginalibus parvis albis numerosis.

A. perfoliata vera. *Willd. Sp. Pl.* 2. 186.

A. perfoliata soccotrina. *Ait. Kew.* 1. 466. *Curt. Bot. Mag. f.* 472.

 A. vera.

A. vera. *Mill. Dic. No.* 15.

A. rubescens? *Plantes Grasses, p.* 15. *cum icone mala.*

A. americana ananifolia floribus suave-rubentibus. *Pluk. Phyt. t.* 240. *f.* 4.

A. vera minor. *Munting. Aloidar. cum icone.*

A. soccotrina. *Woodv. Med. Bot.* with a figure and full account of the medicinal qualities of this and other Aloes.

Obs. By age becomes dichotomous, but has no radical offsets like all the species of this section which precede it.

purpurascens. ALOE foliis ensiformibus glaucis: apicibus recurvis; serraturis marginalibus albis.
42

A. sinuata. *Willd. Sp. Pl.* 2. 187. (exclusis synonymis.) I have not the synonym of *Comm. Hort.* 1. *t.* 48. to examine, but I suppose it belongs to *soccotrina.*

A. perfoliata purpurascens. *Ait. Kew.* 1. 466.

Obs. Like the last, when aged, it has a dichotomous stem, and no radical offsets.

††††† Frutescentes, *foliis multifariis ciliato-dentatis.*

arborescens. ALOE foliis aggregatis ensiformibus glaucescentibus: apicibus reflexis; dentibus marginalibus virescentibus.
43

A. perfoliata β. *Willd. Sp. Pl.* 2. 185.

A. perfoliata arborescens. *Ait. Kew.* 1. 466.

A. arborescens. *Plantes Grasses, p.* 38. *cum icone. Mill. Dic. No.* 3. (excluso synonymo *Commelini.*)

A. caulescens foliis reflexis margine spinosis. *Pluk. Phyt. t.* 129. *f.* 3. *Idem, Pet. Gaz. t.* 88. *f.* 3.

Obs.

Obs. This species (after *ferox*) is the tallest of the Aloes.

africana. 44 Aloe foliis ensiformibus glaucis: inferioribus distantibus; apicibus reflexis; dentibus marginalibus igneis.

A. perfoliata *α.* *Willd. Sp. Pl.* 2. 185. (excluso synonymo *Comm. Pr. t.* 17. et forte, *rar. t.* 44. quæ non vidi.)

A. perfoliata africana. *Ait. Kew.* 1. 466.

A. africana. *Mill. Dic. No.* 4.

A. africana caulescens, foliis glaucis caulem amplectentibus. *Com. Hort. Amst.* 2. *f.* 14. ?

A. africana caulescens, foliis minus glaucis caulem amplectentibus. *Comm. Pr. f.* 18. ?

Obs. Never produces any offsets, and very rarely flowers.

dichotoma. 45 Aloe caule dichotomo, foliis ensiformibus serrulatis glaucis: apicibus erectis. *Willd. Sp. Pl.* 2. 184. *Ait. Kew.* 1. 466. *Paterson Iter. p.* 56, *tabulis tribus.*

A. africana caulescens, foliis magis glaucis caulem amplectentibus. *Comm. Pr. t.* 17. ?

Obs. This is the smoothest-stemmed of all the Aloes. There is only one plant of it now in Britain.

ferox. 46 Aloe foliis ovato-ensiformibus rigidiusculis glaucis: paginis præcipue inferiore regulariter spinosissimis.

A. perfoliata *γ.* *Willd. Sp. Pl.* 2. 185.

A. perfoliata ferox. *Ait. Kew.* 1. 467.

A. ferox.

A. ferox. *Mill. Dic. No.* 22. (excluso synonymo *Muntingii.*) *Plantes Grasses, p.* 32. *cum icone.*

A. africana caulescens, foliis glaucis caulem amplectentibus spinosis. *Comm. Pr. t.* 19.

Obs. This is the loftiest of the Aloes: I have seen it near 20 feet high. It is also the roughest-leaved.

** supralævis.* 47 ALOE foliis oblongo-ensiformibus rigidis glaucescentibus; supra lævibus; infra irregulariter spinosis.

A. perfoliata ε. *Willd. Sp. Pl.* 2. 186.

A. africana caulescens foliis glaucis caulem amplectentibus: dorso spinoso. *Comm. Pr. t.* 20. *Hort.* 2. *t.* 13.

Obs. This species and the last never produce any offsets, and very rarely flower.

** flavispina.* 48 ALOE foliis oblongo-acuminatis glaucis; junioribus patulis; seniori us horizontalibus: lateribus dorsoque interrupte spinosis; spinis latissimis fulvicantibus.

Obs. This species is not much unlike the figure of Dillenius's *A. mitræformis,* but the spines are not of the same colour.

** albispina.* 49 ALOE foliis ovato-oblongis acutis virescentibus: marginibus carinaque valde spinosis; spinis longis; junioribus albissimis; senioribus apice flavicantibus.

Habitat ad Cap. Bon. Sp.

Obs. This is a very fine species, and the largest-spined of all the genus. It never produces any offsets, and has not yet flowered in Europe.

mitræformis.

mitræformis. 50 Aloe foliis imbricatis erectis ovato-acutis.

elatior. A. foliis virescentibus majoribus: spinis marginalibus rarioribus apice flavicantibus.

A. perfoliata *κ. Willd. Sp. Pl.* 2. 186.

A. africana mitræformis spinosa. *Dill. Elth. t.* 17.? foliis magis patentibus.

A. perfoliata mitræformis. *Ait. Kew.* 1. 467.

A. mitræformis. *Mill. Dic. No.* 1.

* humilior. A. foliis glaucescentibus: spinis numerosioribus albis.

* spinosior. A. foliis paulo minoribus et distantioribus: spinis numerosioribus flavicantibus.

Obs. This is perhaps the most stately species in the genus.

brevifolia. 51 Aloe foliis distantibus patulis ovato-acutis.

A. perfoliata brevifolia. *Ait. Kew.* 1. 467.

Obs. This has the most distant leaves of all; they are also the smallest of this section, except, perhaps, those of *A. prolifera.*

APPENDIX.

Having now described all the species and varieties of *Aloe* which I have ever beheld, I rejoice not a little at the ending of the task.

I have given, amongst other select synonyma, a reference to every figured Aloe in my possession; so far at least as they belong to the plants I have described. This is more than I intended, in the outset of the business, to have done; but finding the very involved

involved and intricate state of the whole genus absolutely required it, I redoubled my exertions and new modelled the whole; and, with the assistance of the living plants themselves (which I found indispensably necessary to have always before me), have given to my *specificæ differentiæ* that decisive kind of perspicuity which they could not possibly have received in any other way. I claim no merit on this account, because any other person, of equal diligence, might have done as much, perhaps more, had he been in possession of the same advantageous materials.

Exclusive of all the foregoing species and varieties, which I have described from the living plants, I have still a knowledge, from figures and their accompanying descriptions only, of the following species; an account of which, in a systematical manner, I am advised to add as a necessary appendix to my *Arrangement*, that they may no longer remain the opprobrious impediment of such as are engaged in the study of this genus. The reader must accept them, as I have done, upon the fidelity alone of the authors from whose works I have taken them up; whose names (long since enrolled in the Nomenclature of the science) are at once familiar and respectable to the ear of a botanist, viz. *Muntingius*, *Plukenet*, and *Petiver*, *Commeline* and *Tilli*. For the most part they appear to me tolerable figures; and, from the accuracy which some well-known species accompanying them are represented with, I am inclined to believe that they are themselves not very imperfect. This, however, must be left for time to develop. They are all, without a doubt, specifically distinct from each other; and probably from all my preceding species and varieties also. I do not think any of them have hitherto been in the British collections; neither have they, as yet, been named by any systematic writer, although some of them have been erroneously referred to well-known species.

anomala.

anomala. Aloe subcaulescens foliis trifariis albo et viridi variegatis, laciniis corollæ rubris.

1

A. africana humilis, folio ex albo et viridi variegato, florum petalis reflexis rubris. *Till. Pis. t.* 7.

Obs. This very singular species, although it has been referred to *A. variegata* and *A. viscosa*, is indisputably as remote from the former in the structure of its corolla, as it is from the latter in the size and variegation of its leaves. It must, notwithstanding the colour of the corolla, be inserted in the first subdivision of my arrangement, after *A. aspera.*

tricolor. Aloe foliis sub-linguiformibus acutis reflexis; supra lineatis; apice obsolete crenulatis, corolla albo et viridi variegata.

2

A. africana humilis, folio nonnihil reflexo. *Comm. Præl. t.* 29.

Obs. This curious plant should be inserted after *A. albicans* in the same subdivision.

pertusa. Aloe foliis ensiformibus glabris numerosissime pertuso-punctatis.

3

A. africana glabra, folio minutissimis cavitatibus notato. *Comm. Præl. t.* 25. *sine flore.*

Obs. This odd species, whose flowers we know not, and which is the only Aloe with hollowed dots, should probably be inserted in my arrangement in the same section as *A. verrucosa*, but before it.

muricata. Aloe foliis subulatis; supra planis; undique numerosissime spinosis: apicibus recurvantibus.

4

A. africana foliis erectis superficie spinosis. *Pluk. Phyt.*

Phyt. t. 129. *f.* 2.—" Aloe capensis valde aculeata. *Pet. Gaz. Cat. no.* 463. *t.* 88. *f.* 2. Common prickly cape Aloe. The flowers are wholly purple in my Lord's (the Bishop of London's) paintings, and the stalk all green; in mine, the first are partly yellow, and the last reddish, which may proceed from different growths."

Obs. This plant comes near my *A. tuberculata*, and may follow that species in my arrangement.

ramosa. 5 ALOE foliis lanceolato-ovatis acutis erectiusculis lævibus serrato-spinosis, caule frutescente dichotomo.

A. spinosa arborescens ramosa. *Pluk. Phyt. t.* 129. *f.* 4.

A. capensis arborescens ramosa. *Pet. Gaz. Cat. no.* 264. *t.* 87. *f.* 9.

Obs. This plant, if it does not belong to *A. soccotrina* or *purpurascens*, will range in my system after the latter, in the same subdivision: *A. arborescens*, which is figured on the same plate in *Plukenet*, (*f.* 4.) is the first of the next subdivision.

punctata. 6 ALOE subacaulis foliis imbricatis carinatis incurvatis undique albo maculato-punctatis.

A. africana vulgari similis, floribus rubris et paucioribus. *Pluk. Phyt.* 129. 1.

" A. maculata lævis. *Pet. Gaz. Cat. no.* 463. *t.* 88. *f.* 1. Common smooth Cape Aloe. The leaves edged and spotted with white; the flowers red, but yellow next the stalk. Father *Tachard's* figure seems the same, but that he has omitted the white spots in the leaves. The flowers in the Bishop of London's paintings are all

all red, and somewhat longer; nevertheless I take them to be the same."

Obs. This plant must follow *A. variegata* in my arrangement: if it should prove a variety of that species, the figures are miserably bad.

Petiver, in speaking of the three last-mentioned figures, and his figure of *A. arborescens* (above cited), informs us that his paintings of them do not much differ from the figures of *Plukenet*, which were made from paintings of Father *Tachard's* in the Bishop of London's possession; and *Plukenet* says the Bishop's paintings were done at the Cape itself, from life.

horrida. 7 Aloe acaulis? foliis ovato-ensiformibus undique numerosissime spinosis et tuberculatis.

A. ex Goa foliis crassissimis latissime mucronatis rubentibus: spinis undique sparsis et verrucis tumentibus obsitis. *Till. Pis. t.* 11. *sine flore.*

Obs. If this is a stemless species, it will come into my arrangement before *A. suberecta*; if it is frutescent, (which from its large leaves is very probable,) it is possibly no more than a strong seedling variety of *A. ferox*; from which, however, it differs very much in the erectness of those leaves.

rhodocantha. 8 Aloe of the *Plantes Grasses, p.* 44.

Obs. If this should not prove a variety of *A. glauca*, it should be inserted in my arrangement after *A. depressa.* It differs very much from the latter in its high-coloured spines; those of *depressa*

E 2 are

are white. Colour, I have observed above, although unstable and not to be depended on in most plants, is often in Aloes the best and most permanent mark of specific distinction.

dorsalis. Aloe foliis ensiformibus acuminatis: marginibus dorsoque valde spinosis. *Munting. Aloidar. cum icone.*

Obs. This species may follow *A. barbadensis* in my arrangement.

II. *On*

II. *On the Germination of the Seeds of Orchideæ. By Richard Anthony Salisbury, Esq. F.R.S. and L.S.*

Read January 5, 1802.

Quod nescio quâ falsâ auctoritate vulgo creditum fuit, scilicet *Orchidearum* Semina raro aut plane nunquam germinare, mirum id mihi semper videbatur, et alienum a philosophiâ nostri ævi. Nam, qui campos sylvasque hujus ordinis naturalis feraces vel obiter lustrabit, pene omnium ætatum specimina colligere poterit: gravissimum argumentum, hasce plantas ritu aliorum vegetabilium, suis seminibus propagari. Cum attamen ista fabula obtinuit, in libro ad Tyronum nostratum usum jam tertia vice evulgato, liceat mihi in hac societate Botanicorum, quos, uti nebulæ Solem, errores fugiunt, paucula tam ad imprægnationem seminum *Orchidearum*, quam ad eorum germinationem spectantia, disserere. Haud multas, quidem, e calidioribus regionibus, species adhuc investigare mihi licuit, quibus structura genitalium forsan inusitatior sit: itaque ad indigenas stirpes meas observationes plerumque concinnatas, ab aliis facile repetendas, offero.

Nullas esse partes ego opinor in toto regno vegetabili magis faciles intellectu, quam genitalia hujusce ordinis. Pericarpium inferum, 1-loculare, seminibus triplici serie latere ejus insertis, quatuor ad sex petala variæ in variis generibus figuræ, e margine apicis exserit. Cæterum, intra petala terminatur corpore elongato, crasso, quod verus stylus est, per totam suam longitudinem ut in aliis stylis, pervius. Quisquis *Orchidearum* et *Scitaminearum* plantarum naturam penitius scrutari velit, huic specimina in Sp.

vini

vini asservata ut plurimum commendo, quæ hunc styli canalem clare ostendunt: etenim, si digitis pericarpium inferne comprimas, liquor e pervio centro stigmatis, pulcherrimo spectaculo, confestim ebullit. Stigma vero anticâ parte summitatis styli, latum, et gluten femineum sæpius exsudans, maxime conspicuum fit. Mascula organa, in speciebus monandris quas vidi dorso styli, in diandris contra lateribus ejusdem, absque notabili externo filamento insident. Hæc, vere gynandra, cæteris vegetabilium staminibus insolitam præ se ferunt faciem. A quibusdam Contortis *Linn.* profecto non valde discrepant; inde tamen minime sequitur quod asseruit Stokes, ejusdem omnino Ordinis naturalis esse *Orchideas* et *Apocyneas.* Nostro judicio nulli duo Ordines magis inter se remoti: pro certo enim acotyledones sunt *Orchideæ*, imo cunctas monocotyledones auctorum plantas, eandem simplicem atque nudam embryonis structuram agnoscere, probabile est. Pollen in his stirpibus dari, absolute negat Gærtner: quod si figura, potius quam consistentia et vis fæcundans, essentiam termini constituat, de hac re non amplius disputandum erit. Sapientius ego judicaverim cum Haller, Thunberg, Jussieu, Schreber, pluribusque scientissimis physiologis, flavam illam elasticam ceraceamque substantiam, quæ loculos antheræ implet, sub legitimi Pollinis nomine describere. Centies et supra saltem, illitis hoc spermate stigmatibus in Orchidibus *masculâ*, *Morio*, *latifoliâ*, *maculatâ*, *apiferâ*, Ophryde *spirali*, Limodoris omnibus quæ in horto fuere, et Epidendro *cochleato*, toties constanter perfecta semina, nullo negotio super ollas, et madidas caldarii areas, germinantia obtinui. Sic magnitudine et figurâ solum, minime essentiâ, Sperma memoratarum *Orchidearum* a cæterum vegetabilium Polline abludit: in Orchide *habenariâ* autem secundum Swartz, hoc ipsum globosum est, nec figurâ diversum. Restat mihi nunc, ut iconibus (Tab. I.) et descriptionibus, horum seminum germinationem, plane et dilucide quam potero, exponam.

Orchis

Orchis Morio. *Linn. Sp. Pl. ed. 2. p.* 1333.

Pericarpium 7—9 lineas longum, ellipticum, 1-loculare. Valvæ 3, lineâ prominente costatæ, a basi dehiscentes, deciduæ. Cola (receptacula seminum) 3, ad commissuras valvarum inserta, persistentia, reliquiis funiculorum umbilicalium fimbriata: glabrum.

Semina numerosissima, minuta, colo dense imbricata. Funiculus umbilicalis capillaris. Tunicæ 2; exterior albida, follicularis, versus basin apicemque fusiformis, reticulato-cellularis, maximâ parte vacua; interior fusca, figura et magnitudine albuminis, juxta medium exterioris adnata funiculo umbilicali intus percurrente. Albumen late ovatum, album, carnosum. Embryo minutus, oblongus, cylindraceus, medio albuminis juxta hilum positus, acotyledoneus ne vel minimo placentæ rudimento unquam exserto. Radicula mox in tuber intumescens.

Limodorum Verecundum. *Prodr. p.* 9.

Pericarpium 1¼—2 pollices longum, erectum, sensim versus apicem incrassatum, 1-loculare. Valvæ 6, alternæ angustæ, persistentes; alternæ multo latiores, post dehiscentiam totæ demum deciduæ. Cola 3, medio valvarum latiorum inserta, 2-loba lobis iterum decompositis: glabrum cum rore.

Semina numerosissima, minuta, colo undique dense imbricata. Funiculus umbilicalis seminibus multo brevior, capillaris. Tunicæ 2, exterior albida, follicularis, angustissime conica basi simul attenuatâ, reticulato-cellularis, pene tota vacua; interior ferruginea, figurâ et magnitudine albuminis, supra medium exterioris adnata

funiculo

funiculo umbilicali intus percurrente. Albumen ovatum, carnosum. Embryo minutus, medio albuminis juxta hilum positus, acotyledoneus; radicula mox in tuber excrescens, supra basin cujus fibræ succulentæ sero exseruntur.

Nec aliter reliquæ species *Orchidearum* quas serui, germinaverunt. Ophrys *spiralis* tantum radiculas succulentas citius exseruit. Epidendrum *cochleatum* per aliquot menses tubera sua perpusilla retinebat, dein incuriâ hortulani abunde irrigata, omnia putredine corrupta deprehendi. In pratis nostris, Vermes germinationem horum seminum interdum promovere, rara occasio jampridem me certiorem fecit. Dum enim cespitem luxuriantis exemplaris Orchidis *masculæ* effodiebam, ut in hortum transferrem, foramen Lumbrici Terrestris longitudinaliter scindere mihi contigit, ubi quanto gaudio vix dicere possum, in numerosissimam istius stirpis sobolem vacuo spatiolo sponte nascentem offendi. Harum nonnullæ plantulæ tribus postea annis floruere. Semina in hortis, quamprimum ac maturescunt, seri oportet: felicius proveniunt vel indigena nostræ insulæ, in ollis Hypno *prolifero* cum tantillo humo intersperso repletis, et fimeto modico caloris gradu tepente immersis; hac tamen lege, ne unquam radiis solaribus meridianis plene exponantur.

III. *Account*

Linn. Trans. VII. tab. 1. p. 32.
Orchis Morio Linn
Limodorum Verecundum Prodr.
R.A.S. del.

III. *Account of the Tusseh and Arrindy Silk-Worms of Bengal.*
By William Roxburgh, M.D. F.L.S.

Read January 5, 1802.

THE TUSSEH SILK-WORM.

PHALÆNA PAPHIA.

Ph. *Attacus* pectinicornis elinguis flava, alis falcatis concoloribus ocello fenestratis. *Linn. Syst. Nat.* 2. *p.* 809. 4.

Cramer, 13. *t.* 146. *f.* A. *t.* 147. *f.* A. B. *t.* 148. *f.* A.
Phalæna Mylitta. *Drury,* 2. *t.* 5. *f.* 1. Mas.
Bombyx Mylitta. *Fab. Ent. Syst.* 3. a. *p.* 411. 11.

Bughy of the natives of the Burbhoom hills, where the silk (which the same people call *Tusseh*) is manufactured.

A native of Bengal, Bahar, Assam, &c. Feeds upon the leaves of *Rhamnus Jujuba,* (*Byer* of the Hindoos;) and of *Terminalia alata glabra* Roxb. (*Asseen* of the Hindoos.)

The insects figured on the 75th table of the third volume of Rumphius's *Herbarium Amboinense* appear to be the same, though they are there represented feeding on the leaves of *Rizophora caseolaris* of Linnæus (a tree now called *Sonneratia acida*). His description at pages 113 and 114 in the same volume also tend to confirm the idea of their being the same.

They are found in such abundance, over many parts of Bengal and the adjoining provinces, as to have afforded to the natives,

from time immemorial, an abundant supply of a most durable, coarse, dark-coloured silk, commonly called Tusseh-silk, which is woven into a kind of cloth called Tusseh doot'hies, much worn by Bramins and other sects of Hindoos. This substance would, no doubt, be highly useful to the inhabitants of many parts of America and the south of Europe, where a cheap, light, cool, durable dress, such as this silk makes, is much wanted.

Description of the Insects in their various Stages.

Eggs white, round, compressed, with a depression or pit in the centre on each side; the circumference crossed with rugæ, corresponding with the rings of the inclosed animal. They hatch in from two to four weeks, according to the state of the weather.

Larvæ, or caterpillars, acquire their full size, which is about four inches in length, and three in circumference, in about six weeks; they are nearly the colour of the leaves they feed on, and are composed of ten segments, of which the posterior one is in some degree bifid. There is a light yellowish-coloured stripe on each side, which runs from the second or third anterior segment to the fissure of the last; immediately under these stripes the middle five, six, or seven segments are marked with an oblong gold-coloured speck. The back is also marked with a few round darker-coloured spots, and a few long, coarse, distinct hairs issue from these spots, with others of a smaller size scattered over the insect. They are furnished with eight pairs of legs. The pectoral or anterior three pairs end in a single claw each. The abdominal four pairs are very thick, and truncated like the feet of an elephant. The caudal pair is similar to the abdominal. When the larvæ approach near to their full size, they are too heavy to crawl in search of their food with the back up, as is usual with most caterpillars, but traverse suspended by the feet, as represented in Tab. II. fig. 4.

Chrysalis.

CHRYSALIS. When the caterpillars are ready to spin the cases in which they are to pass this state of their existence, each of them connects, by means of the recent glutinous filament of which the case is made, two or three leaves into an exterior envelope, which serves as a basis to spin the complete case or cocoon in; besides, the case is suspended from a branch of the tree in a wonderful manner by a thick strong consolidated cord, spun of the same materials from the bowels of the animal. See Tab. II. fig. 5. This case is of an exact oval shape, and exceeding firm texture: in it the animal remains dormant and perfectly protected for about the space of nine months, viz. from October until July, so that they make their appearance in time for the caterpillars to come into existence when Providence has furnished them with the greatest plenty of proper food, viz. during the months of August, September, and October. When the insect is prepared to make its escape and be changed to its perfect state, it discharges from its mouth a large quantity of liquid, with which the upper end of the case is so perfectly softened as to enable the moth to work its way out in a very short space of time; an operation which is always performed during the night.

IMAGO. In their perfect state they are wholly taken up in providing for a continuation of the species, and do not exist more than from six to twelve days when confined: how long they may live when at liberty is hard to say, but I imagine nearly the same as when restrained. While in this state of perfection they receive no nourishment whatever, nor have they any mouth or channel by which food can be received. When the female is impregnated she deposits her eggs on the branches of the tree she may be resting on, to which they adhere firmly by means of the gluten they are covered with when newly laid.

 The

The wings of the male expand five or six inches, and those of the female from six to eight: the following part of the description applies to both:

Head scarcely projecting beyond the anterior margin of the first pair of wings.

Eyes large, of a dark brown colour.

Antennæ pectinated; of the male oval, of the female lanceolate.

Palpi four, the exterior two ascending, hairy, covering the inner vesicular, cream-coloured, deflected pair which hide a concavity where the mouth is generally situated in other species.

Mouth none, nor is there any kind of proboscis or tube.

Thorax oval, completely clothed with long fine hair, of nearly the prevailing colour of the wings hereafter to be mentioned.

Abdomen oblong, (of the female much larger) composed of seven segments, and clothed with much long fine hair, like the thorax.

Legs six, hairy, nearly equal. The tarsi with a pair of long, strong, incurved claws. All the articulations are much contracted.

Wings horizontal, expanded, slightly striped in the directions of the tendons. Superior, or first pair, of a cream orange buff, or brownish colour, or a mixture of these; first, all the anterior margins rather concave, beyond that much curved, and bounded with a beautiful light blueish gray coloured belt. Posterior (fan) edges somewhat concave, scolloped, and ornamented with a pretty broad, beautiful, circumscribed, scolloped border, of sometimes a darker, sometimes a lighter, colour than the rest of the wings; inner or abdominal edges nearly straight. In the centre of each wing there is a remarkable eye, with the large pupil of micaceous transparency, and a beautiful party-coloured

iris.

iris. Inferior, or second pair, are in point of colour like the first pair; the posterior margins are also scolloped, and with a similar border, but convex; the eye in the centre of each is also the same. All are clothed with much soft hair, which becomes longer and longer towards the shoulder or points of insertion.

The following interesting history of these most beautiful as well as most useful animals, I have had the good fortune to procure, by means of Mr. William Pope of Mahometpore, and with the writer (Mr. Atkinson's) permission, I transcribe in this place:

To William Pope, Esq.

DEAR SIR,

"I duly received your letter of the evening of the 24th, together with the questions put to you by Doctor Roxburgh on the subject of the Tusseh silk-worm, and shall, with great pleasure, give the best answers in my power to the Doctor's inquiries, previously remarking, that I have an opportunity of consulting two of the hill people, in whose neigbourhood a good deal of Tusseh silk is produced, and whom I have questioned on points imperfectly known to myself. To reply to the Doctor's questions regularly.—

1st. "The cocoons of the insect, which feeds on the Byer leaf, are called by the natives Bughy, producing a Tusseh silk. They are annual, and are said to remain in the cocoon nine months, and to be three months in the egg and worm state.

2d. "This species cannot be domesticated. I am informed that the natives cannot even retain any of it for seed. The hill people say that they go into jungles, and under the Byer and Asseen trees they find the excrement of the insect; on which they examine

examine the tree, and, on discovering the small worms, they cut off branches of the tree sufficient for their purpose, with the young brood on the branches; these they carry to convenient situations near their houses, and distribute the branches on the Asseen tree in proportion to the size thereof, but they put none on the Byer tree. The Parieahs, or hill people, guard the insects night and day while in the worm state, to preserve them from crows and other birds by day, and from bats by night.

"I myself have seen them thus watching the brood. This species cannot be confined, for so soon as the moth pierces the cocoon it gets away; and the people add, that it is impossible to keep it, by any precaution whatever.

3d. "To wind off these cocoons, they put them into a ley made of plantain ashes and water, for about two hours, after which they take them out of the ley, and put them in their wet state into an earthen pot; those which are properly softened are first applied to the reel, and so on, as the cocoons become soft, for four or five days, till the whole are wound off.

"The implement used for taking off the thread is a small common reel of four bars. The cocoons are laid in a smooth earthen dish, without water; the reel is turned by the right hand, whilst the thread of four or five cocoons passes over the left thigh of the spinner, and he gives the thread a twist with his left hand upon his thigh. The operation is this instant in my sight, with a thread of five cocoons, the produce of another species called Jarroo, and described below, but the reeling is exactly the same as that of the Bughy, and therefore one description answers for both. I must add, that the thread is exceedingly apt to come off double and treble for several yards together, which is not regarded by the natives, as breaking off double threads would diminish the produce,

duce, and, moreover, would occasion loss of time: a very even thread, however, may with care be reeled from either the Bughy or Jarroo cocoon.

4th. "The Bughy silk-worm feeds indifferently on Byer and on Asseen leaves, and is a species in every respect perfectly distinct from the insect of the Palma Christi, the latter being different in size, much less cultivated, and fed in houses as regularly as the mulberry worm. I shall not proceed to describe it, as the species is not at all included in Dr. Roxburgh's questions.

"The Jarroo cocoons alluded to above, are so called from being produced in the coldest month of the year, say January; the Bughy being about a month before them. The Jarroo are likewise annual, and the history of them is nearly the same as that of the Bughy; they are however different, I am assured. The Jarroo will eat the Byer leaf if he cannot get the Asseen, but he will always prefer the latter, and produce a better cocoon when fed on it. His silk is more of a dull colour than that of the Bughy, which latter worm the hill people put on the Asseen alone, not because it prefers it to the Byer, but because they have greater plenty of Asseen than Byer, and, moreover, trim and dress out plots of Asseen on purpose for the worms. The principal difference between the above two species is, that the natives retain a part of the Jarroo cocoons for seed; these they hang out on the Asseen trees when the proper season of the moth arrives; when the moths come out, the male insects invariably all fly away, but the females remain on the trees. These are not impregnated by the males bred along with them, but, in ten or twelve hours, or perhaps one, two, or three days, a flight of males arrive, settle on the branches, and impregnate the females; by the bye, the hill people calculate good or ill fortune in proportion to the speedy or tardy arrival of the stranger males. These insects die as soon

as

as the purposes of nature are effected, and the females live only to produce the eggs on the branches of the trees, and then expire. In regard to the Bughy species, they all take flight, females as well as males, and hence the natives firmly believe that they are all males, though I cannot see any physical reason for supposing them so. I have frequently endeavoured to detain the males of the Jarroo species, and have kept them locked up in a box for that purpose; but whether they did not like to make free with their female relations, or from what other cause I know not, but I could never obtain a breed in the domestic state, and the efforts of the male to escape were wonderful, and at last always effectual. The accounts given by the natives of the distance to which the male insects fly are very astonishing. I have put, at different times and occasions, innumerable questions to them on this subject, and they assure me that it is no uncommon practice amongst them to catch some of the male moths, and put a mark on their wings previous to letting them fly, the marks of different districts being known. I am told that it has been thus ascertained that male moths have come from a distance equal to a hundred miles and upwards; I of course cannot vouch for the truth of this, but have no hesitation in declaring that I believe it. The Jarroo worm is guarded on the trees in like manner as the Bughy; this I have had opportunities of seeing on the hills westward of me: the cocoons are darker coloured than the Bughy species, and are wound off as described above. The accompanying skein I had reeled off at my elbow this morning; it consists of five Jarroo cocoons at first, of four when one cocoon was finished, and of three when two cocoons were ended: I then stopped the reel; the three that remained of course gave a filament the entire length of the skein.

"There is still another species of wild silk-worm produced in the

the Burbhoom hills, which I heard is more capable of being domesticated than the one above described; but I dare say you will excuse my saying any thing respecting it, as I can only speak from hearsay, the insect not being produced in these hills.

"Yours very sincerely,

"MICHAEL ATKINSON."

Jungypore,
28th November 1796.

Extract of a Second Letter from the same Gentleman, dated 16*th December* 1796.

"I send you herewith, for Dr. Roxburgh, a specimen of Bughy Tusseh silk. I kept the cocoons by me several days after they had been steeped in the alkaline ley, and they reeled just as well as if they had been newly soaked. The cocoons do not, I think, differ from those of the Jarroo species, except that they are lighter coloured. I send one which the moth has pierced, and will send for more to take down with us. There are none of the Palma Christi species of Tusseh to be had here, but I have sent for some. I fancy this last is the most valuable kind, for the silk piece wove from it is uncommonly durable. The head sircar of the factory here has an outside cover of a palanquin, which, he tells me, has been worn eleven years; also some purdahs, which, he says, have been in constant use nine years, and are not much decayed yet. I remember examining the palanquin cover about five or six years ago.

"I have heard that there is another variation of the Tusseh silk-worm in the hills near Bauglipore; its cocoon is said to be smaller than the cocoons of the Bughy and Jarroo species; perhaps this may be the kind furnished to Doctor Roxburgh by Major Hutchinson: but, after all, I confess it may be suspected that all the variations

are derived from the same insect originally, and that they have assumed different habits by different modes of culture or food.

"When I return from Calcutta I shall make particular inquiries on the subject.

"You will observe that the inclosed specimen is tinged of a deeper colour than the filament of the cocoon: this they say is from the alkaline ley."

The same gentleman (Mr. Atkinson) has, since writing the foregoing letters, sent me large supplies of the cocoons of both the Bughy and Jarroo insects, and I have received parcels of them from other quarters. These have all produced their insects; and after minute investigation I am not able to observe any difference, except in the size, and that is even trifling, so that I can at most only call them varieties of the same species. But very different is that which lives on the leaves of the Palma Christi plant, a species I am now able to give an account and drawings of, having often reared and conducted them through their various stages in my own room within these three years.

THE ARRINDY SILK-WORM.

PHALÆNA CYNTHIA.

Drury, 2. *t.* 6. *f.* 2.
Cramer, 4. *t.* 39. *fig.* A.

Antennæ pectinated; no mouth; wings incumbent, and expanded, with their angles rounded: superior pair falcated, with a black eye near the exterior angle. Prevailing colour brownish, with white and ferruginous curved bands; and an obscure, semilunar, subdiaphanous mark near the centre of each.

This

This insect, known to the Hindoos by the name of *Arrindy* in some parts, in others *Arundi*, appears to be peculiar to the interior parts of Bengal; and, so far as I can learn, to two districts only, viz. Dinagepore and Rungpore, where the natives breed and rear it in a domestic state, as they do the common silk-worm. The food of the caterpillar consists entirely of the leaves of the common *Ricinus*, or Palma Christi, which the natives of these districts call *Arrindy* (hence the name of the insect), and is abundantly reared over every part of India, on account of the oil obtained from the seed. Feeding these caterpillars with its leaves will, therefore, make it doubly valuable where they know how to spin and manufacture the silk.

The late Sir William Jones mentions this animal, in a letter to Dr. Anderson, dated 17th May 1791, under the name of *Phalæna Ricini*, a name that I cannot well continue for fear of confounding it with Fabricius's *Bombyx Ricini;* which is certainly a very different species.

Description of the insects through their various stages.

EGGS numerous, ovate, pure white; size of a pretty large pin's head. Hatch in from ten to fifteen days, according to the temperature of the air.

LARVÆ arrive at their full size, which is from two and a half to three inches, in the space of about one month; during which time they, like the caterpillars of the common silk-worm, cast their skin three or four times. They are also composed of ten segments; across the middle of each are several small, soft, conic-pointed tubercles; otherwise they are smooth and delicately soft. The prevailing colour pale or sea green. In this state they are very voracious, devouring daily many times their

 own

own weight of food. Like the caterpillars of *P. paphia*, they are furnished with eight pairs of legs, viz. three pairs of pectoral, four pairs abdominal, and one pair of caudal.

Chrysalis. The cocoon, or covering thereof, white or yellowish, of a very soft delicate texture; in general about two inches long, and three in circumference, pointed at each end (*Tab. III. fig.* 5. 5.). Enveloped in this case the animal remains dormant from ten to twenty days, according to the state of the weather; when, like the common silk-moth, the now perfect insect, or

Imago, (as Linnæus terms it) issues forth from one end, and in this state exists from four to eight days, during which period it is wholly employed in the grand work of nature, generation; remaining perfectly contented in its chamber, seldom attempting to fly away. In this respect it differs exceedingly from the Bughy and Jarroo moths.

The wings of the female expand from four to five inches; those of the male considerably less. In other respects the following description applies to both:

Head roundish.

Eyes large, bright, dark brown.

Antennæ pectinated, light brown; those of the male narrower; length equal to that of the head and thorax.

Palpi four, as in *P. paphia*.

Mouth none.

Thorax oval, completely covered with long, fine, brownish hair, with a band of white down round the neck.

Abdomen oblong (in the female greatly larger), clothed with much fine white down above, and with alternate triangular spots of white and brown on the sides and belly.

Legs six.

Wings

Wings incumbent, expanded when at rest. Superior, or first pair, falcated; prevailing colour brownish gray. A subdiaphanous, curved, white, and rust-coloured band crosses from the centre of the anterior (sector) margin to near the middle of the inner (slip) edge; from nearly the middle of which, on the inside, another short, white bar runs to the posterior edge of the shoulder, and one to the inner part of the sector edge, forming a dark angular spot in the centre of the junction of these two small bars with the first-mentioned long one. Adjoining to the fore part of this angular spot is a semilunar, somewhat pellucid speck, with a yellowish centre. Near the rounded falcated apex of each wing is a small dark-coloured eye, with the anterior margin thereof white. Their posterior margins are entire, and concave towards the point, with a lighter-coloured border. The inner margins are nearly straight and entire. Both the angles are rounded. Inferior, or second pair, are nearly of the same colour, with a whitish, horse-shoe-shaped belt near the centre, opening on the inner, or slip edge; and inclosing a semilunar spot, like that of the first pair. Exterior margins entire, convex, with a somewhat waved, lighter-coloured yellowish border.

Mr. Atkinson, who furnished me with the most interesting parts of the history of Tusseh silk-worms, has also contributed most of the following remarks on this species.

They are, like the common silk-worm, reared in a domestic state, and entirely fed on the leaves of the Palma Christi plant. Their cocoons are remarkably soft and white, or yellowish; the filament so exceedingly delicate as to render it impracticable to wind off the silk: it is therefore spun like cotton. The yarn,

thus

thus manufactured, is wove into a coarse kind of white cloth, of a seemingly loose texture, but of incredible durability, the life of one person being seldom sufficient to wear out a garment made of it; so that the same piece descends from mother to daughter.

"Since I last wrote to you," says Mr. Atkinson, "I have reared two parcels of Palma Christi silk-worms, with a view towards winding off the cocoons, but all my endeavours to obtain cocoons that would reel off were in vain. I even brought a man from the country where this species of silk-worm is cultivated, and he laughed at my endeavours to get cocoons to reel; asserting that it was impossible, and that they were always spun off into a thread like cotton by the women only: he attempted to show me how, but made a very awkward hand of it, and a very bad specimen of thread: the operation, too, appeared tedious, so that I do not think that any thing is to be expected from this insect, except as a natural curiosity."

Mr. John Glass, the surgeon at Bauglipore, writes to me as follows on the same subject:

"I am glad to hear you have got the worm that feeds on the *Ricinus*, but sorry to say there is no possibility of winding off the silk from the cones. Inclosed is a little of some I bred a few years ago, when I sent a quantity of it to the directors, but have never received an answer. I at the same time sent a little to my friends in England, and I understand that some manufacturers, to whom it was shown, seemed to think that we had been deceiving them by our accounts of the shawls being made from the wool of a goat; and that this Ricinus silk, if sent home, could be made into shawls equal to any manufactured in India."

Extract

Extract of a letter on the same subject from Henry Creighton, Esq. of Malda, dated 12th February 1800.

"The Palma Christi silk-worm goes by the same name as the plant does among the natives, which is *Arrindy.* They accordingly call it *Arrindy-worm, Arrindy-thread, Arrindy-cloth,* &c. They rear it in their houses much in the way the silk-worm is reared. Their manner of spinning it is as follows: Four or five of the cocoons are fastened to a stick stuck in the ground, or sometimes they hold it in their hand. These are united into one thread, and made fast to a piece of wood, with something heavy to make it spin round while suspended by the thread: when they let out sufficient of the cocoons from their hand, it is twisted by this piece of wood spinning round, and when well twisted it is wound round the wood, and another length let out from the hand. The cocoons are spun wet, but only with cold water. The cloth is woven in small pieces in a loom, and is as coarse as light vittree, but more open; and on being washed and beaten well, is made very soft and pliable. It is entirely confined to the districts of Dinagepore and Rungpore; no other place in Bengal having got it. Its uses are for clothing, for both men and women. It will wear constantly ten, fifteen, or twenty years; the merchants also use it for packing fine cloths, silks, or shawls. It must, however, be always washed in cold water; if put into boiling water, it makes it tear like old rotten cloth. There is a cocoon produced wild upon the mango-tree, which they gather, and mix with Arrindy cocoons in spinning. I have only seen one caterpillar of it, and I did not succeed in rearing it. I shall inquire for some, and get a drawing made, if possible, as they cannot be sent or carried to any distance."

EXPLA-

EXPLANATION OF THE FIGURES.

Tab. II.

Fig. 1. The eggs of *Phalæna Paphia.*

2. The newly hatched caterpillar represented feeding on the uncoloured leaf of the jujube-tree.
3. The same, about half grown.
4. The same, full grown, and ready to spin its case or cocoon.
5. The male cocoon suspended, &c. as mentioned at p. 35.
6. The female cocoon, which is always larger.
7. A branch of the jujube-tree in flower, and with the fruit a little advanced.
8. The ripe fruit thereof.

Tab. III.

Fig. 1. The eggs of *Phalæna Cynthia.*

2. The newly hatched caterpillar upon the uncoloured leaf of *Ricinus communis Linn.* or common Palma Christi.
3. The same, about half grown.
4. The same, when full grown and ready to spin.

5.5. The cocoons, sometimes yellow, sometimes white.

6. A branch of the Palma Christi in blossom, but uncoloured, rather smaller than natural.

IV. *Description*

IV. *Description of the British Lizards; and of a new British Species of Viper. By Revett Sheppard, A.B. F.L.S.*

Read March 2, 1802.

The class of the animal creation denominated by Linnæus *Amphibia*, is enveloped in great obscurity from the antipathy which mankind almost invariably entertain to the subjects that compose it. It is this that rendered Mr. Pennant's description of the Lizards of our own country so very short and unsatisfactory as we find it. He describes but three species, viz. *Lacerta agilis*, *L. palustris*, and *L. vulgaris*; merely mentioning two others from Ray's Synopsis, viz. *Lacertus parvus terrestris fuscus oppido rarus*, and *Lacertus terrestris anguiformis in ericetis*: and from Ray's very cursory account, it seems evident that he described them only from report. Thus then the British Lizards hitherto described may, I think, be fairly reduced to three. To these I have been fortunate enough to add two, if not three, that are entirely new.

DIV. I. LAND LIZARDS.

* *Scaly, with round verticillated tails.*

1. LACERTA AGILIS. SCALY OR SWIFT LIZARD.

Head, upper part light brown, with a few black spots; dirty white beneath.

Back, ground colour light brown; a line of irregular black spots along the middle; next to this a stripe, spotted alternately with black and white; then succeeds a broad dark brown one, with

MISSOURI BOTANICAL GARDEN.

a line of black and white spots in it: all these lines extend from the head to the end of the tail.

Belly, in some of a dull white; in others a bright yellow.

Tail, on the under part dirty white, beautifully mottled with black spots; the latter, however, in some specimens are wanting.

Legs, light brown above, spotted with white on the sides, and beneath of the same colour as the belly.

Feet, both fore and hind, have five toes on each, furnished with nails.

Length 6½ inches.

2. LACERTA ŒDURA. SWELLED-TAILED LIZARD.

Head, upper part dark brown, with a few black spots; under part dull white, mottled with black.

Back, on the middle a black list; on each side of that a broad brown one with a line of black spots in it; then a narrow stripe of alternate yellow and brown spots; beneath this a broad, brownish black stripe with a line of yellow spots in it: these lines all end about half an inch beyond the hind legs.

Sides finely mottled with black and white.

Belly of a beautiful orange (in some yellow, in others dirty white,) spotted with black.

Tail bulging out a little below the base (where the lines down the back terminate), which gives it the appearance of having been cut off and set on again: this is of a light ash colour, with a few long black marks at the end, and a large red mark on the under part at the base; the latter, however, varies according to the colour of the belly.

Legs, light brown above, black and white on the sides, and beneath red, yellow, or dull white (according to the belly), variegated with black spots.

Feet

Feet have all five toes, with nails.

Length 4½ inches.

This species I have at different times found in vast abundance; yet not having seen it described in any of the books that I have had access to, I have ventured to call it a new species, under the name, expressive of its conformation, of *Oedura*, or Swelled-tail.

3. LACERTA ANGUIFORMIS. VIPERINE LIZARD.

Head very light brown above, with four dark spots; yellowish white beneath.

Back with a black line along the middle, reaching from the head to about half an inch beyond the hind legs; on each side of this a broader one of dark brown (these beyond the black line unite, and reach to the end of the tail); next to these succeeds a fine yellow stripe that extends to the end of the tail; then a black one, which reaches no further than the middle line, and afterwards a dark brown stripe mixed with a few yellow spots extending to the end of the tail. A little above the hind legs, in some specimens, is a slight division of the scales, forming a transverse line.

Belly yellowish white, with a few black spots.

Tail, under part dirty white, spotted with black as far as within an inch of the end; the remainder marked lengthways with long bars of black.

Legs dark brown spotted with black.

Feet have all five toes, with nails.

Length 7 inches and upwards: I saw one specimen above a foot long, but was not able to catch it.

This lizard, which I think may, with propriety, be described under the name of *Anguiformis*, I have once or twice found

near marshes, but its general abode is upon heaths: this circumstance, together with its viperine appearance and colours, which have more than once deceived me in hastily passing it, induce me to suspect that it must be the *Lacerta anguiformis* of Ray.

** *Without scales, tail compressed sideways.*

4. LACERTA VULGARIS. BROWN LIZARD.

Head compressed; upper part yellow brown, marked with minute dark brown spots: on the forehead of some is a large dark spot; under part yellowish white.

Upper *Eye-lids* dark brown; lower ones dull yellow.

Back yellow brown, with minute darker spots; two deep brown lines reach from the head to the end of the tail.

Belly and under part of the tail red, with a few black dots.

Tail, sides ribbed with dark brown.

Feet without nails: fore feet with four, and the hind ones with five, toes.

Length 4 inches.

DIV. II. WATER LIZARDS.

Without scales, tails compressed sideways.

5. LACERTA PALUSTRIS. WARTY LIZARD.

The whole animal, except on the belly, is covered with small warts.

Head compressed; black above, and below light brown, with white spots or warts.

Back, black brown spotted with black.

Sides light brown, with white spots.

Belly rich orange colour, bordered with fine large black spots.

Tail,

Tail, with an obsolete white mark on the flat sides reaching to the end; the under edge yellowish red, the upper yellow, or in some specimens black: it tapers to a point.

Feet, those before divided into four, the others into five, toes, all without nails: near the insertion the toes are dusky, at the ends yellowish spotted with black.

Length 6 inches, of which the tail occupies half.

6. LACERTA MACULATA*. SPOTTED LIZARD.

General colour pale greenish brown.

Head much compressed; on the upper part are two lines of black dots; the under part is of a yellowish white, with dark brown spots.

Upper *Eye-lids* very prominent (like those of the frog).

Eyes. Irides orange; pupil black.

Nose with a slight longitudinal indenture, in which is a yellowish mark.

Back with two brown lines, which run to the end of the tail: these commence one on each side of the head, but in some specimens are wanting.

Sides spotted with brownish black in lines which generally extend to the end of the tail; but in one specimen that I have by me, only a little beyond the hind legs.

Belly bright red, with dusky spots.

Tail tapering to a point; the upper edge black, under edge orange.

Feet, those before with four, the others with five, toes; all without nails, and of a greenish brown.

Length 4 inches, of which the tail forms half.

This very common lizard seems hitherto to have been undescribed: I have, therefore, named it *Lacerta maculata*.

* An *Lacerta aquatica* Linn.?

I confess

I confess myself very much perplexed with the description Mr. Pennant has given (*Brit. Zool.* iii. 23.) of "some very minute young lizards" that were found under stones and old logs of wood: he says they had much the appearance of *Lacerta palustris*; "were perfectly formed, and had not the least vestiges of fins," the indications of the larva state. These little lizards appear to me to have been a new species, as it is well known that all lizards attain their full growth in their larva state; and it is not till after this period that they lose their fins.

Observations on the Larvæ of Lizards.

Mr. Pennant has remarked of the larvæ of the *Lacerta palustris* (*Brit. Zool.* iii. 24.), that "they have a fin above and below their tail; and that on the upper part extends along the back as far as the head, but both drop off as soon as the animal *takes to the land*, being then no further of any use." In addition to this I have to observe, that the fin on the back extends not merely as far as the head, but quite over it to the nose; that it is very broad and scalloped, and thus gives to the animal a somewhat formidable appearance. As to his assertion, that they *take to the land* on changing from their larva state, frequent observation has confirmed to me that it is erroneous. The fins certainly fall off, and the animals attain their perfect state in the water. That they are sometimes afterwards found on land is true, but this is only in consequence of the ponds in which they were living being dried up by the heats of summer: being, therefore, under the necessity of changing their situation, and finding no other ponds near, they naturally creep for shelter under large stones, and into moist and shady places. I have almost always had occasion to remark, that those found in such situations were lean and enfeebled; and this, in addition to my having very frequently found them in a

 perfect

perfect form in the water, affords good reason for supposing that their situation on land is at once both irksome and unnatural to them.

My *Lacerta maculata* appears to be only what Linnæus has described as the larva of *Lacerta vulgaris*, but merely, I suppose, from the two dark lines which reach from the head to the end of the tail. My specimens are, however, in a perfect state without fins: and the larvæ which I have seen have, like *L. palustris*, a fin upon the back, and above and below the tail: they are also covered with large dark spots. This, as well as the former species, will take a bait either in a perfect or a larva state.

Lacerta vulgaris I have seen of all sizes, from one to four inches in length, but never in any other than a perfect state: a sufficient proof that, like the rest of the *land* lizards, it undergoes no change; and that it is perfectly distinct from *L. palustris*, and *L. maculata*, both of which attain to their full growth in the larva state.

From these observations on the genus *Lacerta*, I proceed to the description of a beautiful species of *Coluber* that I have lately discovered, to which I have given the name of *Cæruleus*, from the elegant azure blue of its belly. This certainly deserves to be ranked as a distinct species full as much as *C. Prester*. When I killed the animal I took down an account of the scuta and squamæ, which I have since lost. They differed in number from those both of *C. Berus* and *C. Prester*; but among the great numbers of snakes and vipers that I have killed and examined, I scarcely ever found two of the same species that had a like number of scuta and squamæ: a sufficient indication how imperfect a part of the specific character these form.

COLUBER

COLUBER CÆRULEUS. BLUE-BELLIED VIPER.

Head, upper part light brown, marked with a dark brown spot in the form of a V; under part, scales yellowish white, edged with dull red.

Irides red; pupil brownish black.

Scales on the margin of the upper jaw yellowish white, edged with brown: jaws somewhat compressed sideways.

Back light brown, and a string of dark brown rhomboidal marks reaching from the head to the end of the tail.

Sides spotted with dark brown.

Belly, the scuta light blue, spotted, particularly at the edges, with white: the first row of scales which margin the scuta is edged with white.

Length 21 inches 10 lines*; head 10 lines: from the head to the anus 18½ inches; and from the anus to the tip of the tail 2½ inches. In the last division the first two inches on the under part are blue, edged with red, and the remaining half inch yellow, spotted with white.

* I have since caught another that measures 25 inches in length.

V. *Description*

...uikshank del.

V. *Description of Bos Frontalis, a new Species, from India. By Aylmer Bourke Lambert, Esq. F.R.S. V.P.L.S.*

Read March 2, and May 4, 1802.

BOS FRONTALIS.

Bos nigro-cærulescens, fasciâ frontali griseâ, cornibus crassis remotis brevibus, caudâ subnudâ gracili apice pilosâ.

Tab. IV.

Obs. Vellus molle. Juba nulla. Labium inferius apice album, pilis hispidis setosum. Fascia frontis plumbea, bases cornuum includens. Cornua pallida.

I received from Sir Joseph Banks the first information of this species, which lately arrived from India, having been sent by the Marquis Wellesley to David Scott, Esq.; and is now in the possession of Mr. Brookes in the New Road, where I saw it. It is, probably, a native of the mountainous parts of that country, and appears perfectly new. In that excellent work of General Zoology lately published by Dr. Shaw, which contains more species, and better arranged, than any work extant, it is not mentioned. The animal appears to be between two and three years old, very tame and inoffensive. A cow of the same species was coming over with it, but died on the passage. This is all we can learn at present relating to this animal.

VI. *Description of the Esox Saurus. By the Rev. Thomas Rackett, M. A. F. R. S. & L. S.*

Read April 6, 1802.

ESOX SAURUS.

Esox rostro subulato, maxillis medio hiantibus.

Tab. V.

Rondelet. de piscibus, lib. 8. *p.* 232.
Gesner, lib. 4. *p.* 468.
Raii Syn. Pisc. p. 169.
Penn. Tour Scotland, 8*vo.*
——- *Brit. Zool.* 3. *p.* 325.

Dorsum viridi-cærulescens. Venter argenteus. Mandibula superior paululum recurvata. Pinna dorsalis et analis opposita, pinnulis utrinque sex versus caudam. Cauda bifida.

The Esox Saurus, Saury Pike, or Skipper, was taken near the Isle of Portland in Dorsetshire, after a hard storm, in the summer of the year 1800. Of the fishermen, one only was acquainted with it, and called it a Skipper. This species, although known to Rondeletius and Gesner, who have figured it, has not been noticed by Linnæus, by Gmelin in the 13th edition of the *Systema Naturæ*, nor by Bloch in his valuable work on Fishes. Ray mentions its having been caught on the Cornish coast. Pennant has given a very indifferent figure of it in his Tour in Scotland, 8vo. and has made use of the same plate in his British Zoology.

The annexed figure represents the fish of the natural size.

VII. *Description*

T. Rackett del.

VII. *Description of several Marine Animals found on the South Coast of Devonshire. By George Montagu, Esq. F.L.S.*

Read December 7, 1802.

As a partial residence for some years on the coast of South Devon, has given me an opportunity of more immediately turning my thoughts on the animal productions of the sea, so my researches, in this confined coast of that unbounded and immeasurable tract, have convinced me how little is yet known of the hidden treasures of the deep.

In pursuit of my first object, that of making myself acquainted with all the *British Testacea* and their animal inhabitants, as far as possible, I soon discovered that much remained to be done in that branch of natural history; having with diligent search and indefatigable attention added nearly double the number of species to those already given by any author, as indigenous to our coasts.

In the different modes which were adopted to obtain these objects, and that mostly under my own eye, it was not possible to examine the mass of matter which was occasionally forced from the bottom of the ocean, without having the attention diverted by the singularity and beauty of the wonderful variety with which that element is replete; and I soon discovered that in the *Crustacea* and *Mollusca*, as well as *Testacea*, the British Fauna, and, perhaps, natural history in general, especially with respect to the smaller marine animals, are far from being arrived at maturity.

Amongst the former, the genus *Cancer* seems to be much more numerous in its species than has been generally imagined; and while

while some have been described as mere objects of the microscope, others of superior size can be supposed only to have escaped notice from locality. In this genus I could add many to those already described as English, the greater part of which appears to be entirely new, or, at least, such as I can find no synonyms for, by the laconic style of most general writers on natural history.

From these I have selected figures and descriptions of six of the most curious.

Of the *Oniscus* there also appear to be many non-descript species, especially amongst the more minute; but I have only selected two for the present occasion: these, as well as those of the preceding genus, are figured only by outlines, as sufficient to elucidate this description.

The *Monoculus* is another tribe of insects which are sufficiently numerous both in fresh and in sea water; but it is somewhat extraordinary, that, out of the species already enumerated by Müller and others, not above ten or twelve are marine: to this division, therefore, many might be added; but as these are only microscopic objects, I shall forbear touching on them at present.

Of the *Intestina* I shall give descriptions only of two species of *Gordius* and one *Sipunculus*: this last, and one of the former, appear to be entirely new; the other so little known as to have been omitted by later writers. These genera are at present very small; one containing five, the other only two, species: the additional ones described possess such strong specific marks of distinction that figures are not required.

To the *Mollusca* tribe a great deal might be added; many of which, from their extreme beauty, elegant and complicated structure, claim no small share of attention and admiration.

In

In this class there are many which seem to vie with each other to astonish the beholder, by the superabundant beauty that seems to be thrown away in the fathomless deep, where, doubtless, thousands of their congenera will ever remain in secret, and never come under the scrutinizing eye of the naturalist.

Amongst this tribe, I trust, one species of *Laplysia* may be added to the very few belonging to that genus; for although it does not exactly correspond with all the Linnæan characters, yet it cannot with equal propriety be placed elsewhere.

Of the *Doris*, figures of five species are given, some of which are certainly new; the others, of which doubts may be entertained, have either never been described as English, or no correct figures of them have ever come to my knowledge.

The genus *Amphitrite* might possibly afford more than one new species; but, as many of these animals inhabit *Testacea* and *Subtestacea* (if the expression may be allowed), the *Sabella*, this may be considered, with the *Nereis* and *Terebella*, as broken genera; for certainly the animals and their cases, or tubes, should go together, and not have different places allotted to them in the system of nature.

If, therefore, the genus *Sabella* is admissible in the order *Testacea*, its several animal inhabitants, like those of real shells, would become a secondary consideration, and serve only as marks of specific distinction. But in this case, that genus should be pruned of all the parasitical branches that have been intruded upon it without reason; I mean the numerous cases of the larvæ of subaquatic insects, or those of the *Neuroptera* order, such as *Phryganea* and *Ephemera* produced in the fresh waters of Thuringia, and equally plentiful in England.

The figure of one species only is herewith given, and it appears to be new; at least no books in my own library, or those

those of my friends within my reach, possess, in figure or description, any thing representing the object in question.

The *Nereis* is a very numerous class, and, doubtless, a variety of new species might be added; but the great difficulty of defining the distinction of some of those already described, makes it still more difficult to determine what might be added: I submit, however, the description of four, whose specific marks are sufficiently strong to induce me to believe that they are new.

To this list of marine animals I shall only add one other, and that of the genus *Asterias*.

In this genus I have not been able to discover much new matter, but am inclined to believe the species, at least those of British origin, have been already multiplied beyond its natural limits; as, no doubt, several described by Borlase, and afterwards by Pennant and others, for distinct, (upon the authority of the former,) are only varieties of a single species, the *A. aculeata*.

The one which I have described is of so extraordinary a growth, with respect to the disproportion between its arms and body, that it cannot be confounded with any other species, and I suspect has not been described; at least nothing like it has come to my knowledge.

Having thus enumerated the subjects described and figured in the accompanying sheets, I beg leave to submit them, with diffidence, to that Society of which I have the honour of being a member; not doubting but the efforts of an individual to elucidate any part of natural history, and in particular that of his own country, will be received with those indulgences to which a remote situation from the metropolis and vortex of knowledge may in some degree entitle him, as few private libraries are capable of affording sufficient information on the various subjects so necessary to the natural historian.

The

The honourable Society may, however, be assured of the accuracy of the outlines represented on the annexed Tab. VI., which were taken by myself; and may equally rely on the faithful representations of the drawings of Tab. VII., which were taken from the living animals by an ingenious friend, whose merit of execution is not more conspicuous than strict attention to character.

Cancer rhomboidalis.

Tab. VI. Fig. 1.

With an uneven subrhomboidal thorax, destitute of spines, but furnished with three large tubercles on the fore part, and two others near the tail: front a broad thin concave plate, projecting into a long sharp-pointed proboscis: antennæ two, setaceous, longer than the proboscis: eyes vastly large, prominent, reticulated, pedunculated, nearly half the diameter of the thorax: arms large in proportion, smooth; on the first joint beneath a hooked spine, turning inwards; fangs toothed: legs eight, subulate; a long spine on the first joint of each, underneath: tail nearly as long as the body, slender, cylindric-depressed, formed with five joints; the end truncated, hirsute: colour, when alive, light olive-green.

Length, from the point of the proboscis to the end of the tail, a quarter of an inch.

Found amongst *Sertularia*, on the back of *Cancer dodecos.*

Cancer maxillaris.

Tab. VI. Fig. 2.

With a subcylindric body of six joints, the anterior one largest; front armed with large, strong porrected jaws, concave above, convex

convex beneath, toothed: antennæ four, setaceous, the upper pair longest, exceeding the length of the maxillæ: eyes scarcely produced, fixed, punctated: arms and legs without distinction ten, subulate: tail small, flat, cylindric, with six joints, terminated with bristles: a few scattered hairs on other parts of the tail and legs: colour, when alive, brown.

Length, a quarter of an inch.

This singular insect has full as much the appearance of an *Oniscus* as a *Cancer;* but the formation of its tail, which is articulated, and received into a proper channel beneath the body, seems to demand a preference to the latter; though perhaps, in fact, it does not strictly belong to any of the Linnæan genera.

Cancer Phasma.

Tab. VI. Fig. 3.

Cancer linearis. *Linn. Syst. p.* 1056. *Gmelin Syst. p.* 2992. *Bast. Op. Subs.* 1. *p.* 32. *t.* 4. *f.* 11. *Turton Linn.* iii. *p.* 761.
Oniscus scolopendroides. *Pall. Spic. Zool.* 9. *t.* 4. *f.* 15.
Cancer Atomos. *Linn. Syst. p.* 1056. *Gmel. Syst. p.* 2992. *Brit. Zool.* iv. *t.* 12. *f.* 32. *Turt. Linn.* iii. *p.* 761.

With a slender body of six joints, independent of the head: on the first joint are two spines, a third on the fore part of the second joint, and a fourth on the head, all pointing forward: the rest of the body smooth: antennæ four, the upper pair nearly as long as the body; lower pair half that length, and the extreme joint of each pectinated with bristles: eyes fixed, reticulated, usually of a reddish colour: close to the mouth are two very short palpi, or feelers, with hooked claws; behind these are two others much longer, armed with single moveable fangs: on the first joint of the body

are

are two long arms, with very large oblong-oval hands, furnished with a strong spine on the inside, and a long moveable fang, which is capable of closing upon the spine, in order to secure its prey: the front of the hand in some is also narrowed and elongated into a spine; the second and third joints of the body are each provided with a pair of flat oval fins; the three posterior joints are each furnished with a pair of long, slender legs, with a single hooked claw; the hindmost are the longest, and originate from the extremity of the body, the animal being destitute of tail.

Length rarely exceeds three quarters of an inch, and seldom so much: colour various, sometimes red, but more commonly pellucid olive green.

The female differs in possessing several plates, or valves, beneath the body, situated between the two pairs of fins: the office of these is to carry and protect its eggs or young, at which time they extend very considerably, and form a kind of pouch. We have seen this receptacle distended with ova from fifteen to twenty, readily distinguished through the transparent plates. In this part a very strong pulsation is observable.

While examining a female in a watch glass of sea water under a microscope, we were agreeably surprised to observe not less than ten young ones crawl from the abdominal pouch of the parent; all perfectly formed, and moving with considerable agility over the body of the mother, holding fast by their hind claws, and erecting their heads and arms.

On a small species of *Fucus* (the name of which was not noted) a vast number of these curious insects were collected, of both sexes, and of all sizes. When at rest they only held by their hind claws; in motion, the arms were also used, and the progression

was somewhat similar to that of the looper caterpillars, or larvæ of the moths of the Linnæan division of *Geometræ**.

There seems little doubt but this is the insect intended by Mr. Pennant under the title of *Cancer Atomos*, and which Gmelin has quoted for the Linnæan *Atomos*, although he expressly says it inhabits running waters. On this head Mr. Pennant is silent; at the same time quotes *Baster's mirum animalculum in corallinis*, which is evidently marine. Gmelin quotes the figure given by Baster for the *C. linearis*, and expresses a doubt, after describing *C. Atomos*, whether it be distinct from the *linearis*.

We have collated this matter as far as opportunity and the obscurity of the subject will permit, and have scarce a doubt but that the *linearis* and *Atomos* of Linnæus are the same; and that the figures given by Pennant, Baster, and Pallas are to be referred to for the insect in question; and though by no means correct, there is sufficient character to induce us to believe that these are our *C. Phasma*.

It may seem strange to bring together two insects that are said to inhabit such opposite places as fresh and sea water: such mistakes, however, may be found in other parts of the *System of Nature*, and are strongly marked in the same genus; the *C. Pulex* and *C. Locusta* have been confused by an erroneous supposition that both occasionally inhabit fresh as well as salt water.

Whoever will take the trouble to compare our figure with those above quoted, will find all the appendages to the body correspond, except the pair of minute *palpi* close to the mouth, which those figures want; and that no tail is to be found in ours. Some allowance, however, must be made in figures of microscopic objects,

* Some are destitute of spines on the body and arms, and differ somewhat in the formation of the latter; besides having that part extremely tomentose.

jects, which not only may appear different to another person in a different point of view; but also require more than ordinary care in the delineation; and after all, an engraver too frequently destroys the little character such delineation may possess.

In the great variety we have examined, not even the rudiment of a tail ever appeared, and the only variation seemed to be in the hands, which in some were much broader, and, as well as the back, were destitute of spines.

Being inclined to consider, with Gmelin, that the *C. Atomos* and *linearis* may be the same; and as we have little doubt but such will be considered as no other than our *C. Phasma*, a name which had been given to this species previous to an investigation of the subject so closely; it has been thought proper to retain it, that those who fall into the same opinion may bring the two Linnæan insects together under a new name, in order to prevent further confusion, which might be the case were they joined under either of the original names.

Cancer palmatus.

Tab. VI. Fig. 4.

With a smooth, somewhat compressed body, with thirteen joints: colour, when dead, pale yellowish brown: antennæ four, superior pair longest, half the length of the body; each pair composed of three large joints, with several small articulations at the end: eyes large, fixed: arms two; hands remarkably large, flat, triangular, furnished at the upper angle with a moveable fang, capable only of closing upon the middle, or palm, which is formed a little concave; the back of the hand convex; joint of the wrist deeply cut, or indented, on the lower side: legs six; thighs broad, flat: caudal fins two pairs, subulate, with two joints each; the extreme joint of the tail is furnished with two small appen-

dages;

pair not half so long as the other: legs fourteen; feet of the foremost six broad, serrated on the inside; all armed with a single claw.

Length, an inch; breadth, not quite a quarter. Colour, pale yellow clouded with cinereous on the sides.

Gordius marinus.

Sea long worm. *Borlase Cornw. p. 255. t. 26. f. 13.*

This extraordinary vermis, originally described by Borlase as inhabiting Mounts Bay in Cornwall, we do not find mentioned by any other author: and as this topographical writer is very concise with respect to its description and history, our further observations upon it may not be unacceptable to the Society, and to naturalists in general.

This species of *Gordius* is not uncommon on several parts of the south coast of Devonshire, where it is by some of the fishermen known by the very applicable name given to it in the *History of Cornwall.* It is, indeed, of so prodigious a length that it is impossible to fix any bounds; some of the fishermen say thirty yards,—but perhaps as many feet is the utmost: those specimens which have come under our inspection did not appear to exceed twenty feet, and more commonly from eight to fourteen or fifteen.

Its usual appearance is filiform, except towards the posterior extremity, where it somewhat decreases in size; it is, however, like most of the soft animals, considerably amorphous: the skin is perfectly smooth, and covered with a strong tenacious slime: the head, or anterior end, is usually more depressed, and broader than any other part; but all parts are equally alterable, and in continual change from round to flat, rising into large swellings or protuberances in various parts, especially where touched: the front is sometimes obtusely pointed, but more commonly spread into small

small indentations, or has a somewhat quadrifid appearance: the mouth is small, and placed longitudinally beneath: the vent is situated at the other extremity, through which the fæces are ejected in a singular manner. For this operation the end is raised, and a small inflated transparent bladder is first protruded, into which the fæces are then driven, and retained for a few seconds; after which they are expelled with force in a continued small stream, like a fine slender worm of a light yellow colour.

If the animal be wounded, or the body divided, small threads of milky appearance issue from the wound, and do not mix with the water without agitation: the same happened in spirits; for on putting one alive into diluted alcohol it divided into several parts by violent contraction: this lacteal fluid, on being shaken, rendered both spirit and water turbid.

Its colour is generally dusky brown, with a tinge of green; rarely rufous brown, with five faint longitudinal lines the whole length of a paler colour.

The largest are taken by dredging, in old bivalve shells; but are sometimes found under stones at low water, always coiled or contorted in the most complicated manner: those which we have kept in sea water never attempted to extend themselves, but confined their motion wholly to contortion.

The expansion and contraction are so unlimited that it is scarcely possible to ascertain the utmost length of this worm: one which was esteemed to be about eight feet long was put alive into spirits, and instantly contracted to about one foot, at the same time increasing double the bulk, which originally was about the diameter of a crow's quill. In the vast exertion of the muscles, the animal is generally divided at those parts which had been twined into knots.

This worm is very difficult to preserve perfect without contraction; for, if suffered to die in its natural element, one part will decay

decay while the other is alive; and the addition of any thing offensive produces contraction; even fresh water.

Gordius annulatus.

This beautiful worm is of a garnet red colour, with a pure white line along the back, and another on each side, extending the whole length; between these are two rows of minute white spots, commencing about an inch from the head, and extending quite to the posterior end, the extremity of which is rounded and white: the fore part of the head, except the upper lip, is also of that colour: at small irregular distances are white transverse lines or bands that encircle the body, some of which are broader than the rest.

Length, six or seven inches: diameter at the anterior end, one line; rather less at the posterior.

This, like the preceding, is capable of great contraction, expansion, and variation in shape; spreading in some parts, while others rise into swellings: but its more usual form is a little flattened.

Several of this species were taken in old shells, and amongst coralline, by dredging. In all probability it is not common; otherwise an animal with such strong specific characters could not have been overlooked.

Sipunculus Strombus.

Body rather more taper than cylindric in its contracted state; but, when extended, the anterior end, for nearly one half its length, is not above half the size of the posterior: it is quite round, and not the least depressed in any part; the larger end seems less capable of contraction than the anterior; this latter being endowed with the singular property of retracting or withdrawing itself internally, in the same manner as the common *Limax* withdraws the

ocellated

ocellated tentacula, receding by degrees at the mouth until the more slender part of the body is, as it were, turned outside in*: the mouth is surrounded with *laciniæ*, or short feelers: the colour is livid, and the whole animal smooth and firm, except about the middle, or just behind the part which increases in size, and where the vent is placed, which is verrucose.

Its utmost length appears to be between three and four inches; the diameter of the largest part, one-eighth of an inch.

Of this genus of *Intestina* there do not seem to be more than two species hitherto described: the *S. saccatus* was supposed only to inhabit the American and Indian seas, till it was discovered to be British by Mr. Martin of Teignmouth: *S. nudus* has been longer known to be indigenous to our coasts, and is not uncommonly found buried in sand near low water mark†.

This animal is parasitical, taking possession of the old shells of *Strombus Pes Pelecani*, to which it seems peculiar, for in no one instance have we been able to discover it elsewhere. It is remarkable that the aperture of this shell, which is contracted or narrow, is ill calculated for the habitation of *Cancer Bernardus;* and of course becomes better adapted for the dwelling of the *Sipunculus*, as not likely to be destroyed or molested by that predatory insect.

Where this species of *Sipunculus* is found, old shells of *Stromb. Pes Pelecani* are not uncommon; and not a single instance occurred that such were not taken possession of by this animal: and as the *Hermit Crab* is more plentiful in the same place than

* This circumstance, which has not been generally noticed, seems to be a strong generic character.

† Both these are figured in Martin's *Marine Vermes*, i. *t.* 1. *f.* 2. 3. The former is also figured by Pallas in his *Spicilegia Zoologica*, x. *t.* 1. *f.* 8. and the latter may be found in the *British Zoology*, iv. *t.* 20. *f.* 10.

 we

we ever remember to have seen it elsewhere, occupying every other deserted turbinated or spiral shell, from the small *Turbo pullus* to the *Buccinum undatum*, it must be concluded that the adopted habitation of this *Sipunculus* is not suited to the form of that crab; a matter of no small proof of the wise dispensations of an omnipotent power, the source of original instinct, with which animals, even the most contemptible in appearance, are endowed for the preservation of their species.

This animal further secures itself from the attack of other enemies by closing up the aperture of the shell (except a round hole sufficient for its body) with sand strongly agglutinated together; and this as far in the shell as is necessary for contracting it to the size required. Within this the larger or posterior part of the animal, as far as the vent, is concealed in the spiral volution, protruding occasionally that part only which is capable of internal retraction.

It differs from *S. nudus* in being much shorter and verrucose for a considerable space behind the vent, in not having so sudden a decrease in size before the vent, and in the fringe or feelers round the mouth being longer; it has also much greater retractile powers in proportion to its length, and when wholly receded within the shell is seldom above an inch and a half long.

Laplysia viridis.

Tab. VII. Fig. 1.

With the fore part of the body like a commmon *Limax:* tentacula or feelers two, flat, but usually rolled up, and appear like cylindric tubes; at a little distance behind the tentacula, on each side, is a whitish mark, in which is placed a small black eye: the body is depressed, and spreads on each side into a membranaceous fin, but which gradually decreases from thence to the tail,

or

or posterior end: this membranous part is considerably amorphous, but is usually turned upwards on the back, and sometimes meeting, though most times the margins are reflected; this, as well as the back, is of a beautiful bright grass-green colour, marked on the superior part of the fins or membrane with a few small azure spots, disposed in rows; the under part with more numerous, but irregular spots of the same: the fore part of the head is bifid; the lips marked by a black margin: the sustentaculum is scarce definable, as it most commonly holds by a small space close to the anterior end, and turns the posterior end more or less to one side: it sometimes, however, extends itself for the purpose of locomotion, in which it scarce equals a snail.

Although this animal does not strictly correspond with the characters prefixed by Linnæus to the genus *Laplysia*, yet it approximates so nearly to the *L. depilans* in its external form, that we cannot hesitate to place it with that animal, though we could not discover any membranaceous plate* or shield under the skin on the back.

While we are on the subject of the *Laplysia depilans*, we cannot help remarking how strange it is that the poisonous touch and offensive smell, which appear to have been the origin of its name, should be without reason handed down to posterity, and that such an opprobrium should have so long been fixed upon one of the most harmless and inoffensive of creatures.

On the coast of Devonshire we have had frequent opportunities of handling these animals with impunity; for they neither affect the hand nor the olfactory nerves, but are as destitute of smell as of any depilatory power. They seem, on this part of our coast, to

* This part is properly corneous, and is the link between the true *mollusca* and *testaceous* animals. The *Bulla aperta* and some other shells are concealed in the same manner by their respective animals.

grow

grow to as large a size as in the Mediterranean sea, being sometimes taken five or six inches in length, and when contracted would fill a large tea-cup. The beautiful purple dye which is discharged so copiously from this animal might, possibly, be turned to some advantage, if a method could be devised to fix it: we have seen several yards of a fishing-net stained with it under water; and with difficulty it is washed off the hands.

DORIS PINNATIFIDA.

Tab. VII. Fig. 2. 3.

With the front rounded; body slender, somewhat taper: colour gray, spotted with olive green: on the fore part two trumpet-shaped tentacula, terminated by a retractile filiform appendage: along the back are two rows of pedunculous appendages, longer than the diameter of the body; these are of a conic shape, each composed of five or six series of blue gray papillæ, marked with a black spot at their tips: the stem or centre part of the peduncle is a mixture of olive green and rufous brown. Fig. 3. is a magnified representation of the peduncle.

Length, three-tenths of an inch.

DORIS CÆRULEA.

Tab. VII. Fig. 4. 5.

With a linear body, of a green colour, covered with large blue clavated tubercles greenish at their base, and tipped with orange; these are disposed in several transverse rows: tentacula four, sub-filiform, green: eyes placed at the base of the hindmost tentacula: between the second and third row of tubercles are two pink oval vesicles on the back, a little inclining to one side. Fig. 5. represents the peduncle magnified.

Length, a quarter of an inch.

DORIS

Doris flava.

Tab. VII. Fig. 6.

Doris clavigera. *Gmel. Syst. p.* 3104. 5.? *Mull. Zool. Dan. t.* 17. *f.* 1. 3.?

With a white body spotted with bright orange yellow: in the front are four long, pointed, orange-coloured feelers, whitish at their base, projecting forwards: on the top of the head two upright wrinkled tentacula of the same colour: the vent is placed on the back near the posterior end, surrounded by seven feathered appendages; beneath which, on each side, is another long appendage, quite smooth, and larger than the tentacula; these are all tipped with orange: the sustentaculum projects very considerably behind, where it becomes extremely slender.

Length, rather more than half an inch.

Doris marginata.

Tab. VII. Fig. 7.

Doris lævis. *Gmel. Syst. p.* 3106. 22.? *Mull. Zool. Dan.* ii. *t.* 47. *f.* 3. 5.?

With an oval white body tinged with pink in the middle, surrounded with a thin membranaceous margin: the front usually formed into four obtuse points; sides undulated: tentacula two, wrinkled or slightly feathered; these issue from two depressions, retractile: vent furnished with feathered members: sustentaculum broad.

Length, a quarter of an inch.

A variety rather larger, of a pale sulphur-colour, tinged or slightly mottled with pink on the upper part of the body and members of the vent.

These

These have a slight roughness in appearance when examined by a lens; but must not be confounded with *D. verrucosa*, which is also found on the south coast of Devon, and is strongly tuberculated, and in other respects very different.

Doris maculata.

Tab. VII. Fig. 8. 9.

With a slender body, tapering to a point at the posterior end, furnished with several pairs of large subclavate peduncles along the back: the summit of each of these is cleft or divided round the margin, usually sexpartite; the centre is somewhat concave, from whence arises a single papilla: front obtuse: tentacula two, large, trumpet-shaped, from the middle of which springs a long, slender, filiform, retractile appendage: colour pale yellow, with minute spots of pink.

Length, a quarter of an inch, or rather more.

The tubercles on the back of that from which the drawing was taken were four pairs, and a single one near the extremity of the body. The peduncle magnified is shown at fig. 9.

Amphitrite volutacornis.

Tab. VII. Fig. 10.

The length of this singular and beautiful animal is about five inches, and the breadth half an inch; near the head a little depressed, and somewhat smaller towards the posterior end, where it is more flattened, and terminates in a tongue-shaped point: the tentacula are more than an inch long, elegantly plumose and convoluted: the stem is furnished with long ciliated fibres on one side; and as it makes about three spiral turns, the fibres become

come equally extended in a spiral direction; the plumes on the lower part of the tentacula meet near the mouth, which is very little protruded; these are of a light yellow brown, banded and mottled with chesnut: behind the head a ruff or scalloped membranaceous reflected margin, composed of four parts or petals, which almost meet underneath, of a dark purple colour in the front, edged with white; pale beneath: scutellum composed of ten joints, with three rows of plates; those of the middle largest, and of a yellow colour; the sides purplish: the other part of the body above is formed of four series of plates or scales, with a slight sulcus down the middle of the back; the segments of this part are about eighty, of a dark purple brown colour: on each side is a row of tubercles, one at each annulation, and a small pencil of retractile bristles; those on the sides of the scutellum are most conspicuous: the plates or segments beneath are single.

This elegant species of *Amphitrite* was taken by dredging for oysters, and was brought to us alive in sea water. In this situation an opportunity offered of examining the curious structure of its beautiful tentacula, which far exceeds the pencil of the artist. These are not in the least retractile, but are capable of more or less extension, by more or less contortion, and may possibly at times be thrown out at full length; but the animal never showed any such inclination after it was taken, though kept alive for several days, and when dead was more contorted than before. The fibres are sometimes laid close, at other times expanded at right angles, showing the columella or stalk.

The animals of this genus are usually of a soft nature, and generally protect their tender bodies by a tubular case, into which they can wholly recede: this, on the contrary, by the firmness of its

its skin, seems to require no such artificial covering, and probably never prepares such a case*.

Nereis iricolor.

This is the largest species of the genus hitherto noticed as an inhabitant of the British seas. Its length, when alive, was about three feet; nearly round, or very convex and cylindric, but tapering a little near the anterior end: upper lip somewhat protruded, whitish; at the base of which are four minute black spots disposed in a transverse row: no tentacula or feelers, nor visible eyes: the posterior end, half an inch from the tip, suddenly decreases in size, and tapers to an obtuse point: this part is of an orange red; the rest of the animal is of the most beautiful prismatic colours, changeable in different points of view, but of an olive green hue in general appearance, becoming of a fine purplish red near the anterior end: the segments are about three hundred and ninety, with as many tubercles and fasciculi on each side.

It was about the size of a raven's quill when extended, but, being immersed in fresh water, contracted to one foot in length, increasing in bulk to the size of a goose quill.

This beautiful species of *Vermes* we found coiled under a stone amongst the rocks at Milton.

Nereis Margarita.

Body long, convex above, cylindric, tapering a little near the posterior end: colour changeable greenish bronze, with a slender

* This, though somewhat similar to the Amphitrite that inhabits *Sabella penicillus*, the *Corallina Tubularia Melitensis* of Ellis, must not be confounded with it: the convoluted tentacula, doubly ciliated fibres, and very superior magnitude, are sufficient marks of distinction; besides which, the knots or joints in the long fibres of the tentacula of this are not to be found in the other.

purple

purple streak down the middle of the back: segments about seventy-four, furnished with as many peduncles and fasciculi on each side, and a short filamentous appendage to each peduncle: the fore part of the head is divided into three lobes, the two outer ones are largest, and the end of each is furnished with a small tubercle, which seems capable of some extension, and possibly may be wholly retractile; the middle lobe terminates in two short feelers; at the base of each of the outer lobes are four others, very similar: the mouth is placed beneath, and is capable of being protruded, armed with two dark coloured fangs; but these are not visible when the mouth is contracted: at the base of the protruded part of the mouth is a circle of numerous minute black spots: round the fangs are five other series of the same, and two at the upper part: at the extremity of the posterior end are two filaments: the whole under part of the animal is paler than the upper, and when examined by a lens exhibits a beautiful pearly gloss.

Length, five or six inches; diameter, about one-eighth of an inch.

Inhabits the same place as the last, and is equally rare.

Nereis lineata.

Body slender, depressed, yellow, with numerous fine purple spots disposed in six lines; two along the back, and two along each side: segments about one hundred and twenty: tentacula six; two pairs in front scarce longer than the tubercles, and one on each side the head of a superior length: posterior end furnished with two short appendages.

Length, one inch and a half.

Taken by dredging in deep water: rare.

Nereis octentaculata.

Body depressed, red, with two long, and six short, red setaceous tentacula: eyes four, one pair placed behind the other: along the back a purple line, with a yellow spot at each joint: segments between eighty and ninety, with as many peduncles and fasciculi on each side.

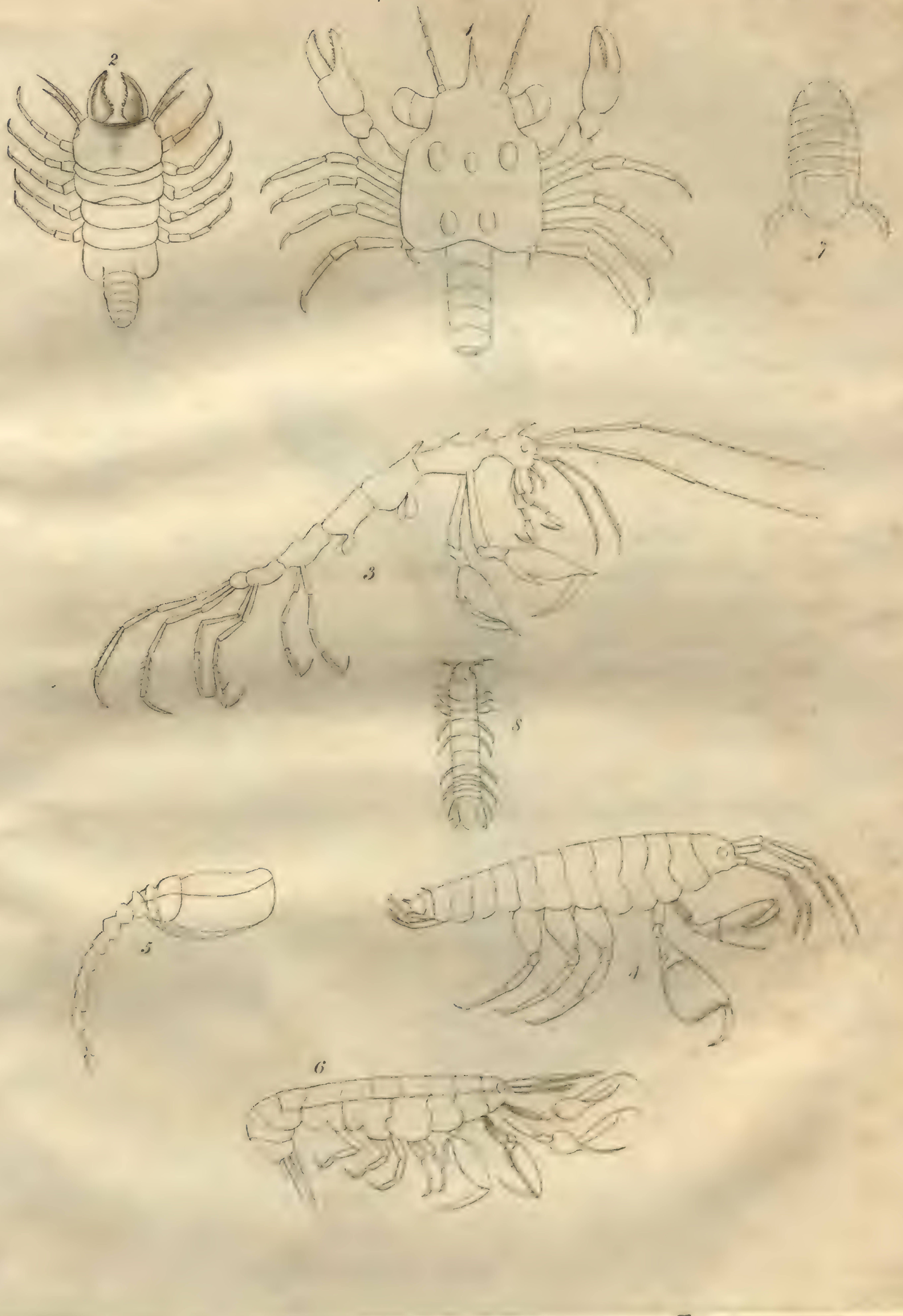
Length, three inches; breadth, rather more than one eighth of an inch, but less at the posterior end.

Found with the preceding, and equally rare.

Asterias brachiata.

Body roundish, or sub-pentangular, covered above with small oval scales disposed in ten alternate broad and narrow rays; the smaller rays rather conic, terminating between two oblong smooth plates, placed at the junction of each arm: the arms are five in number, extremely long and slender, very gradually decreasing to their ends: each of these is composed of between three and four hundred articulations, which appear like so many smooth scales above and beneath; the sides are furnished with very small moveable spines, eight or nine in a row, at every joint; the scales near the body beneath are bisulcated longitudinally; and the arms at that part run quite to the centre or mouth; which is a small cinquefoil, and appears to be formed of four little plates regularly placed at each angle: on the body, between the arms, the surface is rough, with minute papillæ: colour, when alive, purplish brown, and sometimes blueish ash colour.

Diameter of the body, scarce half an inch; length of the arms, from seven to eight inches, making in all an extent of about sixteen inches, or four feet in circumference. One in my cabinet, whose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Linn.Trans.VII. tab.7. p.84.

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whose body is only three-eighths of an inch diameter, has the arms seven inches in length, which is more than eighteen diameters of the body; a disproportion not before noticed in any species of *Asterias.*

This extraordinary animal is taken in sand at one particular part of Salcomb bay, where that article is collected for manure. The only perfect specimens obtained were such as had been dried in a heap of the sand. In any other way it would be impossible to kill them without breaking into small pieces, from the extremely fragile quality of the rays or arms.

It is, probably, a very rare species, as we do not find it described by any author an opportunity has offered of consulting.

We have never found it but in the place above mentioned, and there only a few have occurred.

REFERENCES TO THE PLATES.

Tab. VI.

Fig.

1. Cancer rhomboidalis.
2. ——— maxillaris.
3. ——— Phasma.
4. ——— palmatus.
5. ——— Scorpioides.
6. ——— articulosus.
7. Oniscus hirsutus.
8. ——— cylindraceus.

Tab. VII.

Fig.

1. Laplysia viridis.
2. Doris pinnatifida.
3. ——————— peduncle magnified.
4. ——— cærulea.
5. ——————— peduncle magnified.
6. ——— flava.
7. ——— marginata.
8. ——— maculata.
9. ——————— peduncle magnified.
10. Amphitrite volutacornis.

VIII. *Descriptions of four new British Lichens.* *By Dawson Turner, Esq. M.A. F.L.S.*

Read January 18, 1803.

Upon the four Lichens of which I now take the liberty of offering descriptions to the Linnean Society, I have little more to say, in general, than that they do not appear to me to be noticed, either in the works of Professor Hoffman, in Dr. Acharius's comprehensive *Lichenographia Suecica*, or in the productions of any other author with which I am acquainted. To say more would be presumption; for so many botanists have treated of Lichens in partial Floras, and introduced what they considered as new species, not only without figures, but with very inadequate characters, that it is possible these also may have been previously described: but, even should this prove the case, I trust the Society will not think I have done an altogether useless office, in endeavouring, by coloured figures, and more ample descriptions, to remove them in future beyond the reach of doubt. Thus much I may be allowed to say, that they are unknown to Dr. Smith, Mr. Dickson, and every other botanist who has at present seen them; and if, in the particulars I have stated respecting each, I should appear prolix, I beg leave to give it as my humble opinion, that, from the vast extent of the genus Lichen, particularly the *crustaceous* division of it, nothing less than the most detailed account of every species, pointing out its differences from those of its congeners with which it is most likely to be confounded, will ever suffice to

to the obtaining a knowledge of them*: and I cannot but think that there is in botany no greater desideratum than a work on the Lichens, conducted on these principles, and at the same time carefully collecting the synonyms of the different authors. I must be indulged in one more remark, arising from this subject, which is that while some botanists, anxious to create new species, have not made among these the same* allowances as among other vegetables, for differences caused by the several periods of their age, by their situation, by the substances on which they grow, or by the aspects to which they are exposed, it appears to me that others have run still more hastily into the opposite extreme, and united plants which are most truly and specifically distinct, merely because in some particulars they approach each other in different stages of their growth; not considering that among other genera of the class *Cryptogamia*, instances are occasionally found of plants bearing in age a stronger resemblance to some other species than to the appearance they had themselves when young: but that similitude between one individual, while verging upon decay, and another in its highest perfection, is very far indeed from constituting a proof of identity. Great difficulties are unquestionably opposed to our researches among the Lichens; but these difficulties are increased tenfold, if we examine them without at the same time endeavouring to trace them through their

* Very strong proofs in favour of this observation are afforded by *Lichen muscorum* and *L. impressus* of Acharius, both which are almost universally considered as distinct species; though any botanist who will be at the trouble of examining the former may soon be convinced that it is nothing more than the common *L. parasemus*, which, in passing from a wall or moss, necessarily acquires a less compact crust; a thing I have myself repeatedly traced: and as for the latter, I am as fully convinced, not so much from my own observations as from the suggestions and specimens of my acute friend Dr. Scott, Professor of Botany in Dublin, that it is only the scutella of *L. scruposus*, occupying the leaves of *L. pyxidatus*.

various

various gradations, or if we form opinions without having seen them in different states; for no error is more pernicious than that of those botanists who promise themselves to acquire a knowledge of them by means of their herbaria alone, as, however useful single specimens of this tribe may be for the sake of reference, the naturalist that puts too much reliance upon them will find, as soon as he meets with the plants in their places of growth, that he has studied at home for little else than to confuse others, and bewilder himself.

LICHEN CHRYSOCEPHALUS.

1. LICHEN crustâ granulosâ pallidè flavâ vix cohærente; bacillis nigris; tuberculis aurantiacis, margine pallidiore.

Tab. VIII. Fig. 1.

Innascitur sudibus antiquis prope Sotterley in Suffolciâ.

Crusta latè effusa, modicè crassa, e granulis minutis, pallidè et interdum viridi flavis, nitidis, subglobosis, formæ tamen nequaquam certæ, hìc congestis, illìc sparsis, vix cohærentibus constat. Bacilla, ex hâc, nigra, altitudine linearia vel sesquilinearia, filiformia, crassitie humani capitis pilos vix æquantia, copiosè assurgunt. Horum apicibus insident tubercula rotunda, superficie plana aut convexiuscula, quorum disci, per pulverem quo replentur, aurantiaci, margines autem pallidè flavi, crustæque ferè concolores sunt. Plantâ senescente, pulvis e tuberculis excidit, unde concavi nigrique fiunt, mox tubercula ipsa delabuntur et bacilla inania restant. Varietatem hujus plantulæ inveni, cujus tubercula, ferè sessilia, glomeratìm coacervantur.

The only place in which I have hitherto seen this Lichen is at Sotterley, near Beccles in Suffolk, where I found it, April 7th 1802,

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in company with Mr. Dickson, on old pales that surround the park of Miles Barnes, Esq. I am acquainted with no species, either British or foreign, for which it can possibly be mistaken; and indeed it is nearly allied to hardly any, except *Lichen sphærocephalus*, from which the yellow powder of its tubercles affords at first sight an obvious and certain difference: were it not for this circumstance, it might in some cases be difficult to discriminate between the two plants, as it is well known that *L. sphærocephalus*, from being seldom provided with any crust of its own, has been alternately placed among the Fungi and Lichens, and that, though it generally arises from the naked trunk of a hollow tree, or from a decaying post, it sometimes shoots up among other species, thereby tending greatly to mislead an inexperienced observer. On this account it appeared at first sight so singular that such tubercles as those of *Lichen chrysocephalus* should be found with such a crust, that it was long before I could persuade myself they really belonged to each other; but, after repeated examinations, I see them so constantly together, that I can no longer feel doubts on the subject. This species most frequently grows in irregularly oblong patches, about four inches long, and two wide; the pale though bright yellow of its crust makes it conspicuous at a distance; yet, unless closely examined, it is easily overlooked for *flavus, candelarius*, or some other of the more common species. It belongs to Dr. Acharius's eighth tribe, the *Calicia*, and must be considered a highly interesting Lichen, as forming, together with *L. inquinans* of English Botany, a link that unites the plants of this division with the *crustaceous* tribe. At the same time, however, it deserves to be noticed, that many of those referred hither in the *Lichenographia Suecica* have no pretensions to such a situation; and, unless carried back to their former place among the Fungi, must involve this difficult part of

of botany in greater confusion than ever. In this number is *L. acicularis*, with which, from its former name of *fulvus*, it might be presumed that *L. chrysocephalus* had a strong affinity: nor is there any thing in the specific character that satisfactorily destroys such an idea; and yet, considered as to their substance, nature, tubercles, or crust, they can by no means be arranged even in the same genus.

Lichen fuscellus.

2. L. crustâ crassâ lævi areolatâ griseâ intus nigrâ; thalamis planis subimmersis minutis atris.

Tab. VIII. Fig. 2.

Habitat in ecclesiarum muris apud Bradwell et Gorlestone in Suffolciâ.

Crusta absque normâ effusa, lineam et ultra crassa, superficie æqualis, lævis, rimosa, aut, ut aptiùs dicam, in areolas figuræ magnitudinisque incertæ diffracta; colore extùs pallidè griseo, intùs nigro. Thalami valde minuti, atri, satis copiosè in crustæ areolis nascuntur; juniores, ut in *L. endocarpo* et *miniato* immersi; adultiores ferè sessiles; omnes ambitu subrotundi, superficie plani, nunquam, ut in Verrucariis reliquis, pertusi, marginis expertes. Crusta aquâ madefacta colorem non mutat, sin digito fricetur fit viridis, speciemque pristinam nunquam reversuram, omnino amittit.

This Lichen is by no means uncommon on churches about Yarmouth, growing in scattered patches of irregular size and figure, and generally preferring loose sand stone at no great distance from the ground. From its dull colour, scarcely differing from that of the substance on which it grows, and its imperfect appearance, it is easily overlooked; yet is, nevertheless, not only a distinct

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but also an interesting species, as it shows how nature, by insensible gradations, unites even those tribes that are most different from each other; its thick crust and immersed thalami, not punctured at the summit, leaving it almost doubtful whether it has not as good a claim to a situation among the *Endocarpa* as among the *Verrucariæ*. I should, however, certainly place it with the latter; but even here I must be allowed again to observe, that Dr. Acharius has introduced several plants which, in my opinion, belonged far more properly to the Fungi; and I trust that these remarks will not be considered as made with a view to detract from the character of that excellent botanist, of whose merits I am fully sensible; for even he has entertained doubts upon the subject: and it may be hoped, that in the new edition now preparing of his *Lichenographia*, he will reject all those species that are not provided with a real crust, separable, or at least easily distinguishable by the eye from the substances to which they are attached. From Dr. Acharius's description, it might be supposed that the present species is the same as his *L. griseus:* but it is to be observed, that he takes up that plant on the authority of Dr. Persoon, who, in the place referred to, says that the crust is green within, and turns to that colour also, if moistened; in both which points it entirely disagrees. There is a Lichen found occasionally on old oaks, and not at present, I believe, noticed by any author, from which it seems to me more probable that *L. fuscellus* is not specifically distinct. They agree in colour and appearance, but differ in the thalami of that which grows on wood not being of so regular a form as those of the other, as well as in its crust being far less thick: and hence I have not ventured upon making them the same; for in plants themselves so minute we cannot but expect the species to be separated by minute differences.

 3. LICHEN

3. Lichen luteo-albus.

L. crustâ leprosâ tenuissimâ albâ; scutellis vitellinis; junioribus planiusculis, adultioribus tuberculiformibus.

Tab. VIII. Fig. 3.

Habitat in cortice arborum; prope Croydon, D. Dickson: in insulâ Monâ, D. Davies: in comitatu Durham, D. Harriman: apud Acle et Coltishall in Norfolciâ.

Crusta leprosa, tenuissima, alba, nitida, ab arborum, quibus innascitur, truncis vix nisi colore dignosci potest. Hanc ferè obtegunt scutellæ, ambitu subrotundæ, numerosissimæ, confertæ, magnitudine papaveris seminum, initio planiusculæ, vel levissimè concavæ, margine tenuissimo, et si per lentem attentè observentur, pallidiore cinctæ; progrediente ætate, tuberculorum formam æmulantes, et sæpe, dum madent, subglobosæ. Siccatæ fiunt compressæ. Color his plerumque vitellinus interdum aliquantulùm virescit.

Among the crustaceous Lichens scarcely any subdivision is attended with more difficulty than that with yellow shields; for what some authors have considered as varieties of *Lichen candelarius**, and others have regarded as distinct species, are so numerous, and occur in so many different forms, that this single circumstance has given rise to an infinity of perplexity. It is not, therefore, without the greatest diffidence that I now hazard

* In speaking of *L. candelarius*, I think it necessary to observe, that I do not intend the plant so called by Dr. Acharius, but that which Professor Hoffman has figured in his *Plantæ Lichenosæ* under the name of *L. vitellinus*, and which by Mr. Dickson and most other botanists is considered the true *L. candelarius*.

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the introduction of what I suppose to be a new species of this tribe; nor should I have ventured upon so doing, had I not believed the present plant to have been altogether overlooked by authors. Yet, spite of this circumstance, it may be presumed, from the various parts of the kingdom in which it has already been found, that it is not of very uncommon occurrence. It generally grows upon old trees, and not unfrequently in the hollow parts of them, where it is immediately conspicuous by its numerous yellow shields. The indefatigable researches of Mr. Harriman have also discovered it, though very sparingly, upon stone: but in this case care must be taken to discriminate between it and *L. aurellus* of Hoffman, from which it principally differs in the nature of its crust, and in the shields assuming, as they grow old, the form of tubercles. These two circumstances will also at all times keep it separate from any of the appearances of *L. candelarius*, the crust of which is always pale yellow and powdery. Instances may, however, occasionally be found of the shields of that Lichen occurring without any crust. But even in such case the two plants are not to be confounded; for the scutellæ of *L. candelarius* are almost always deeply concave, and are uniformly of a much lighter colour, as well as larger size, than those of *L. luteo-albus*. From *L. cerinus*, with which it agrees in crust, it differs in the shields never having a white margin in their smaller size, and in their being destitute of the greenish hue so remarkable in that species. From Mr. Dickson's *L. luteus*, its leprous, inseparable crust, its more pale shields, and the form they assume in an advanced state, equally separate it. The colour of the shields keeps it likewise apart from *L. rupestris* of Acharius (*L. calvus* of Dickson), in which species they are considerably darker, and, when young, are immersed in the very substance of the rock on which they grow; nor are they by any means either so numerous or so small.

small. It is now many years since I first found *L. luteo-albus* on elms at Acle in Norfolk; Mr. Dickson showed it to me growing plentifully on lime trees at Croydon, and I have lately found it on willows at Coltishall.

4. LICHEN PORRIGINOSUS.

L. crustâ tenui pulverulentâ albo-virescente: scutellis fuscis; junioribus niveo-marginatis concavis, adultioribus tuberculiformibus.

Tab. VIII. Fig. 4.

Innascitur ulmi montanæ cortici apud Caistor prope Yarmouth.

Crustam habet tenuem, pulverulentam, sparsam, e granulis minutissimis, globosis, neutiquam cohærentibus, constantem; siccam albam, madidam pallidè virescentem, Byssumque botryoidem valdè simulantem. Scutellæ huic insident raræ, subrotundæ, magnitudine ferè Ervi seminis, initio concavæ, disco fuscæ, margine niveæ; progrediente ætate fiunt planæ, mox convexæ et tuberculiformes, marginis omnino expertes. Madefactæ ceraceam quandam et ferè subdiaphanam præstant speciem; siccatæ atro-fuscæ evadunt.

The situation which naturally belongs to this Lichen, at least among the British species, is between *subfuscus* and *vernalis*, with both which it has points of striking affinity. Its shields in colour approach nearly to those of the former, but differ in regularly assuming, as they grow old, the shape of tubercles; and, still more strongly, in their border, while young, being of a snowy white, and of a substance quite dissimilar to the crust; whereas the scutellæ of *L. subfuscus* are for the most part more concave in age than in youth, and their margin always appears not only to be homogeneous with the crust, but also in general to be a mere elevation

Linn. Trans. VII. tab. 8. p. 94.

1 Lichen chrysocephalus

3 Lichen luteo album

2 Lichen fuscellus

4 Lichen porriginosus

elevation of it. Besides this, the crust of the two species is altogether dissimilar: in *subfuscus* it is continued, white, solid, between leprous and granular; in *porriginosus* it is a congeries of very minute, powdery, greenish, unconnected particles, thinly spread over the bark of trees, and almost mealy. Between the present species and *L. vernalis* there is a still greater resemblance; their crust is nearly the same, they seem to prefer the same tree, and even their shields differ in no particular so much as in colour; which, however, among the Lichens, at least in the present state of our knowledge of them, must, if constant, be allowed to be sufficient to form the basis of specific characters. Relying upon this circumstance, there is no difficulty in discriminating between them at first sight; especially by observing the borders of the young scutellæ, which are highly useful in distinguishing both these species, but to which, in *L. vernalis*, sufficient attention has not been paid. I am not aware that *L. porriginosus* is likely to be overlooked for any other British species: but in the foreign catalogue there is one that it still more nearly resembles: this is *L. viridescens* of Dr. Schrader's admirable *Spicilegium Floræ Germanicæ*, from which its leading characters of difference are its powdery crust, the white margin of its young shields, their preserving in age a regular form, and their being thinly scattered, not crowded together, or often heaped upon each other, as sometimes occurs in Mr. Dickson's *L. Sphæroides*. *L. porriginosus* may be reckoned among the more rare species, having, as far as I have heard, been hitherto found only in one place, and there merely on a few trees. I first met with it in company with Mr. Dickson in the beginning of April 1802. From its remarkable crust it may, as mentioned in the description, easily be overlooked as a variety of *Byssus botryoides*, and the deception is considerably increased by its growing, like that species, chiefly near the roots of trees.

IX. *Descriptions*

IX. *Descriptions of some Species of Carex from North America.*

By Edward Rudge, Esq. F.L.S.

Read April 5, 1803.

I HAVE the honour to lay before the Linnean Society the description of five species of Carex from North America, which do not appear to have been described in any botanical work extant.

The few specimens that have hitherto been received from that quarter of the globe, show in almost every instance that there is a striking dissimilarity between the American species of this genus and those of European growth; and if some American botanist would undertake accurately to investigate the former in their different stages of growth, I have no doubt but many new species would be added to this already numerous tribe.

CAREX OVATA.

CAREX spicis androgynis ovatis pendulis, capsulis ovatis acutis.

Tab. IX. Fig. 1.

Folia erecta, tenuia, marginibus aspera.

Culmus erectus, triqueter, angulis acutis, asperis.

Spicæ androgynæ quatuor vel quinque, densè imbricatæ, pedunculatæ, ovatæ, pendulæ; squamis ovatis, acutis, fuscis, capsulam æquantibus (Fig. 1. a.); bracteæ ad basin pedunculorum subamplexicaules.

Capsulæ ovatæ, compressæ, acuminatæ, ore diviso (Fig. 1. b.).

Stylus stigmatibus tribus, glandulosis, crassiusculis.

Habitat in *Newfoundland.*

CAREX

Linn. Trans VII. tab. 9. p. 96.

Carex tenuis.

Carex spicis fœmineis filiformibus laxis pendulis, capsulis oblongis rostrato-acuminatis.

Tab. IX. Fig. 2.

Folia pallidè virescentia, ad margines hispida, culmo longiora.

Culmus tenuis, debilis, triqueter, angulis glabris.

Spica una mascula terminalis, erecta, linearis.

Spicæ fœmineæ flexuosæ, circiter quatuor, tres prope summitatem culmi, infima remota; pedunculi capillares.

Capsulæ oblongæ, rostratæ, rostro longo, tenui, apice diviso (Fig. 2. b.).

Squamæ oblongæ, glabræ, acutæ, capsulâ dimidiò breviores (Fig. 2. a.).

Stylus stigmatibus tribus.

Habitat in insulâ Americæ borealis *Long Island* dictâ.

Carex intumescens.

Carex spicis fœmineis paucifloris, capsulis inflatis ovatis striatis rostrato-acuminatis.

Tab. IX. Fig. 3.

Folia lata, erecta, nigro-viridia, marginibus carinâque asperrimis, culmo longiora.

Culmus erectus, triqueter, angulis obtusiusculis glabris, supra bracteam inferiorem asperis.

Spica una mascula, terminalis, linearis, longè-pedunculata.

Spicæ fœmineæ floribus laxè imbricatis, pedunculatæ, pedunculis brevissimis.

Squamæ oblongo-ovatæ, acutæ, capsulâ dimidiò breviores (Fig. 3. a.)

Capsulæ oblongo-ovatæ, maximè inflatæ, erectæ, striatæ, rostratæ, rostro longo acuto, apice diviso (Fig. 3. b.).

 Stylus

Stylus stigmatibus tribus.

Semina ovata, triquetra, glabra, acuminata lutea (Fig. 3. c.).

Habitat in Carolina.

As *Carex intumescens*, above described, may possibly be supposed, from its inflated capsules, to be nearly allied to *Carex folliculata* of Linnè, I have annexed a figure of the latter taken from a specimen I received from America, and of which there is one in every respect similar in the Herbarium of Sir Joseph Banks.

CAREX FOLLICULATA.

CAREX spicis terminalibus pedunculatis: mascula fœmineaque, capsulis subulatis longitudine spicæ. *Linn. Sp. Pl.* 1387. 31.

Tab. IX. Fig. 4.

Gramen cyperoides marianum, tamarisci belgarum pericarpiis ad intervallum calami glomeratis. *Pluk. Mant.* 96. *t.* 419. *f.* 1.

Habitat in Canada.

CAREX FLEXILIS.

CAREX spicis fœmineis ovato-oblongis pendulis, capsulis ovatis rostris acuminatis.

Tab. X. Fig. 1.

Folia erecta, tenuia, marginibus carinâque hirsuta, culmo breviora.

Culmus triqueter, debilis, angulis glabris.

Spica una mascula angusta, terminalis, erecta, ferè uncialis.

Spicæ fœmineæ tres vel quatuor, pedunculatæ, pedunculis longis, inferiori longiore, oblongo-ovatæ demùm pendulæ, duæ prope summitatem culmi oriuntur, infimæ remotæ ex sinu foliorum prodeunt.

Squamæ ovatæ, acutæ, margine hirsutæ, capsulâ ferè dimidio breviores (Fig. 1. a.).

Capsulæ

c
b
a
c
b
a
2
1

Capsulæ ovato-oblongæ, rostratæ, apice diviso (Fig. 1. b.).
Stylus stigmatibus tribus glandulosis.
Semina ovata, triquetra, glabra (Fig. 1. c.).
Habitat in *Newfoundland.*

Carex gigantea.

Carex spicis masculis teretibus erectis; fœmineis grandioribus turgidis, capsulis inflatis globosis rostrato-acuminatis patentibus.

Tab. X. Fig. 2.

Folia lata, nigro-virentia, culmo multò longiora, marginibus carinâque hispidis, nervosa, nervorum interstitiis nodosis.
Culmus erectus, striatus, triqueter, glaber.
Spicæ masculæ tres compositæ è squamis densè et imbricatim positis; duæ supremæ, tertia infima sessilis in alâ folioli valdè angusti.
Spicæ fœmineæ omnem speciem hujus generis plerumque magnitudine maximè præstant; superior modicè incurva, sessilis in sinu folii, cæteræ alternæ, pedunculatæ, pendulæ, floribus laxè imbricatis, divaricatis.
Squamæ oblongo-ovatæ, aristatæ, nervo dorsali, margine tenero albo, capsulâ dimidiò breviores (Fig. 2. a.).
Capsulæ globosæ, maximè inflatæ, striatæ, laxè imbricatæ, aristato-rostratæ, divaricatæ, ore bidenticulato (Fig. 2. b.).
Stylus stigmatibus tribus.
Semina triquetra, glabra (Fig. 2. c.).
Habitat in Carolina.

In the descriptions above given, and the delineations which accompany them, all the precision and accuracy have been endeavoured to be observed, that the several dried specimens of each species from which they are taken were capable of affording. The

of specimens in different stages of growth prevented me from giving the parts of fructification in a more early state; and for a complete and more satisfactory description we must depend on those who may have an opportunity of examining them in a state of cultivation.

In the investigation of the natural character of this genus, it appears that the true limits of the genus want to be more accurately defined towards the completing a more perfect arrangement of the known species, and I am disposed to entertain an opinion, that the *Androgynous* species may with propriety be made a distinct genus from those which have the male and female spikes separate.

N. B. In all the figures of Tab. IX. and X. the letter *a.* denotes the *Squamæ,* *b.* the *Capsules,* and *c.* the *Seeds.*

X. *Remarks*

X. *Remarks upon the Dillenian Herbarium.* *By Dawson Turner, Esq. F.R.S. A.S. & L.S.*

Read April 19, 1803.

THE *Historia Muscorum* of Dillenius is a work of so great authority, as well for the excellence of its figures and descriptions as for the extensive knowledge and consummate accuracy of its author, that it must be regarded as the surest medium now left us of becoming acquainted with the various tribes of Mosses and Algæ described by Linnæus and all subsequent writers down to the present day. In referring to this work, however, it has not unfrequently happened that differences of opinion have arisen as to the plants really designed by the learned Professor, and a confusion of synonymy, than which nothing is more perplexing or injurious to science, has necessarily been the consequence. To remove this in some measure appeared a task likely to be not altogether useless, and the only certain mode of effecting it was evidently by a careful reference to the original specimens. With this design Mr. Joseph Woods and myself, therefore, on the 28th of February last, went to Oxford, where, by the kindness of Professor Williams, we were allowed to examine the *Herbarium* now preserved in the botanic garden at that city. It is the result of this examination that is here offered to the Linnean Society; but it may be well in the first place to observe that our expectation was not disappointed; for the specimens, which are in good preservation,

servation, fully prove the accuracy of their former possessor, agreeing precisely with the *Historia Muscorum*, according to which they are arranged, each fastened on thin pasteboard, and marked with the name as well as generally also with the number it bears in that work. The Submersed Algæ were our leading object: in these, therefore, I shall notice every individual; but in the Mosses and Lichens shall mention no species, except where it appears that the plants designed by Dillenius have been misunderstood. In undertaking a task of this kind it would be unpardonable presumption to suppose that we have detected every error in the references of authors to this Herbarium, or that we have ourselves fallen into none. We know that the former of these is not the case, and we have every reason to fear that the latter is equally improbable. We beg, therefore, for the same indulgence towards our errors that we show towards those of others; and, above all, we deprecate the suspicion of our being urged to publish these remarks by a wish to detract from the reputation of preceding writers, or by any other motive than the most earnest desire to promote the cause of science. We offer these cursory observations as little more than an inducement for more able botanists to follow our example with greater effect. Well, indeed, may we be convinced of their imperfections; for, independent of the inadequacy of our own abilities to the task, it would require at least a week of uninterrupted leisure to examine properly the Dillenian Herbarium, and it was in our power to bestow but one day upon the investigation: this day Dr. Williams obligingly allowed to be both long and unbroken, but still it served us only to look through the Confervæ, Ulvæ, Lichens, and Hypna, with some attention, and to take a hasty view of the remaining genera of Mosses, but not to open a single sheet of the Jungermanniæ.

CONFERVÆ.

CONFERVÆ.

No. 1. It is singular that the very first species is almost the only instance where we met with a complete difference between the figure in Dillenius's work and the plant in his *Herbarium*. The specimen evidently grew in a loose straggling manner, from which circumstance, and the tenuity of its filaments, it seems to be *C. spiralis* of Roth. Both the description, however, and figure appear designed for *C. rivularis*, to which all authors have referred them. The variety "*e muscis lecta*" is a very different plant, with the habit of *C. compacta*, Roth; but its threads are distinctly jointed, and somewhat thicker than those of that species. This also is on the same paper marked "*C. maderaspatana in Angliâ lecta*," but differs from the specimen of *C. maderaspatana* from Plukenet's Herbarium, which is of a whitish colour and unlike any species with which we are acquainted.

2. *C. nitida. Fl. Dan.*

3. The specimen is entirely destroyed by age; a thing very much to be regretted, as no means are now left us of clearly ascertaining the *C. fontinalis* of Linnæus, Hudson, and others, a plant about which a variety of opinions prevails among the botanists of this day.

4. *C. confragosa. Fl. Scot.*—Dr. Roth's *C. velutina*, under which he refers to this number, appears from specimens, with which he has been so obliging as to favour me, a distinct species.

Of 5. and 6. there are no specimens*; the former, however, of these is so accurately described as to leave no doubt of its being

* I have always noticed, where there are no specimens, that other botanists may know where the *Herbarium* is deficient, and consequently where no information is to be derived from a reference to it. In all these cases the figures are cut out and pasted in the places.

C. limosa

C. limosa of Dillwyn: but we have great reason to lament Dillenius's not having preserved the latter, as Hudson's *C. furcata* depends* solely upon it.

7. A very narrow variety of *Ulva compressa*, quite bleached. Dr. Roth refers to this number for the *C. nitens* of his *Catalecta Botanica*; but the plant there intended must, according to his description, for I have never seen a specimen, be a widely dissimilar species. It may be worth remarking that he, by a typographical error, quotes "II. 6." instead of "II. 7."

8. *C. fœniculacea. Fl. Ang.*—From the specimens, of which there are three in the Dillenian Herbarium, this is a *Fucus*, and one that I believe to be not yet described.

9. *C. dichotoma. Linn.*

10. Hudson, the only author who appears to have mentioned this No., has quoted it as the β. of his *C. furcata:* there are three specimens, one of which is *C. fracta, Fl. Dan.*; a second *C. amphibia*; and a third what we suppose to be a small variety of *C. dichotoma.*

11. Of this plant, the so much contested *C. bullosa*, which every botanist believes he knows, but of the existence of which, as a single species, I greatly doubt, there are two papers. The first contains four specimens; three of them, in an unexpanded state, are so bad that it would be idle to conjecture what they are: the fourth is Dr. Roth's *C. divaricata var. β. elongata.* On the other paper are also four specimens, two of which, quite bleached, may be referred to almost any thing; the third is *C. jugalis, Fl. Dan.*;

* Unless, indeed, of which I am not aware, Hudson should have given specimens to any of his friends. What I have hitherto seen and received under the name of *C. furcata* leads me to coincide with a remark made by that able botanist Dr. Goodenough, that it is probably only the first stage of *C. dichotoma*, or a small variety.

the

the fourth, a species different from all the rest, and, we believe, not at present described.

12. *C. albida. Fl. Ang.*—Dr. Roth, in the 2d volume of his *Catalecta Botanica*, quotes this plant as a variety of his *Ceramium tomentosum*, for which he refers to the following number; and he observes, that it has at first sight a strong resemblance to his *C. nitens* (No. 7.): both which remarks, with all due deference to so truly able a botanist, I must, on the authority of the Herbarium itself, pronounce unfounded.

13. All authors have agreed in referring to this number as *C. tomentosa*, and it appears by the description to be intended for that plant: but the specimens, though bad, seemed evidently, to Mr. Woods and me, to be only *C. littoralis*, with a somewhat more rusty hue than usual.

14. *C. reticulata.*

15. Of this there are eight specimens, none of them sufficiently good to allow a positive opinion to be passed upon them: they appeared to us nothing more than a short variety of *C. amphibia*. I need hardly observe that this number is the *C. canalicularis* of Linnæus, or that the following number

16. is *C. rigida. Fl. Ang.*—This I had expected to find a variety of *C. fracta*; but it more resembles *C. glomerata*, much battered, and incrusted with calcareous matter.

17. *C. frigida. Roth.*—There are three specimens, none of them good, but all the same plant; so that it may be questioned if Dr. Roth was not mistaken in his remark, that Dillenius confounded this plant with *C. amphibia*, and in consequently referring only IV. 17. A. to *C. frigida*, but B. and C. to *amphibia*.

18. This appeared to us a minute variety of *C. fracta*, gathered while growing upon stones; but we beg to be understood as speaking with more than usual diffidence on this subject.

 19. *C. littoralis.*

19. *C. littoralis. Linn.*—Specimens much better expanded and of a paler colour than No. 13.

20. *C. æruginosa. Linn.*

21. Dr. Roth, in the first volume of his *Catalecta Botanica*, referred this plant, with a mark of doubt, to his *C. Hermanni*, but in the second corrected this reference, and carried it to his *C. cirrosa*, with which, according to specimens sent by my friend Professor Mertens, it agrees. It has no connexion with Mr. Dillwyn's *C. repens*, *t.* 18. but is hardly distinct from young plants of Hudson's *C. pennata.* The specimens in the Herbarium differ extremely from the magnified figures in the *Historia Muscorum*, their ramification being entirely pinnated, and the branches simple.

22. *Sertularia spinosa. C. cancellata* of Linnæus, Hudson, and other authors.

23. *C. scoparia.*

24. This looks only like a stain upon the paper, if, indeed, it really exists there, which we could not determine: it does not seem to be noticed by any writer.

25. There are three specimens of this; one, *C. capillaris, Linn.*, the other, what has been called the fresh water variety of it. Dr. Roth has named the latter *C. capillaris*, and the former *C. linum.*

26. A species quite new to us.

27. *C. prolifera. Roth.*?—I subjoin a mark of doubt, not from any hesitation in my own mind, but because I had not a specimen at Oxford to compare; and all quotations from memory are necessarily liable to error.

28. This appeared to Mr. Woods and me a new species, distinct from *C. rupestris*, to which Hudson has referred it as a variety.

29. *C. rupestris. Linn.*

30. *Ceramium*

30. *Ceramium asperum. Roth.*—The learned author of the *Catalecta Botanica* quotes No. 28. to this plant with a mark of doubt; but the specimens of the present number exactly agree with those he was so kind as to send me.

31. *C. glomerata. Linn.*

32. *C. vagabunda. Linn.*

33. *C. sericea. Fl. Ang.*

34. A small variety of the preceding, as Dr. Roth has justly considered it in the second volume of the *Catalecta Botanica*: in the first he has adduced it as a synonym to his *C. mutabilis*, but erroneously, as my friend Mr. Dillwyn has already stated in his account of that plant.

35. From the difference in Dillenius's three figures of this plant, it is singular that no author has observed that he has blended two distinct species under it. His Herbarium shows that A. is a small variety of *C. rubra*; B. and C. are *C. polymorpha*; D., which is not mentioned in the *Historia Muscorum*, is another variety of *rubra*.

36. *C. corallinoides. Linn.*

37. *C. setacea. Fl. Ang.*—Dr. Roth has referred this, with a mark of doubt, to the "*var. β. atro-purpurea*" of his *C. diaphana*: it must at the same time be admitted that the Dillenian figure is far from good.

38. It is well conjectured in the *Catalecta Botanica* that A. and B. must be different species; but it would hardly be possible to suspect, what appears from the Herbarium, that the former is *C. rubra*, the latter *Fucus subfuscus*. Dr. Roth has erroneously referred this number to his *Ceramium elongatum* (*C. elongata, Fl. Ang.*), and still more erroneously quoted *C. nodulosa* as a synonym.

39. This plant, the *C. tubulosa, Fl. Ang.*, appears to be only an unusually thick variety of *C. rubra*, as was suggested to me many

years since by Col. Velley. There is a smaller specimen, marked "*junior*," which may be a distinct species, but is much bleached.

40. *C. diaphana. Fl. Scot.*—I cannot doubt but *C. nodulosa*, *Fl. Ang.* is the same plant.

41. *C. purpurascens. Fl. Ang.*

42. *C. gelatinosa. Linn.*

43. A small variety of the same.

44. *C. mutabilis. Roth.*

45. This has always been considered an alpine variety of *C. gelatinosa*; but some specimens I gathered last summer in Llyn Fynnon Velan, an alpine lake on Snowdon, where I had an opportunity of examining it recent, lead me strongly to suspect it will prove a distinct species.

46. *C. atra. Fl. Ang.*

47. *C. fluviatilis. Linn.*

48. *C. torulosa. Roth.*—Is it really distinct from the preceding?

TREMELLÆ.

No. 1. *Ulva lactuca. Linn.*

2. The same *var.* β. *Fl. Ang.*—Very different from *U. lubrica* of Roth, to which it is referred in the *Catalecta Botanica.*

3. *U. umbilicalis. Linn.*

4. There is no specimen of this in the Herbarium; but, both from the description and figure, it cannot be doubted that Dr. Roth is right in referring it to his *U. plantaginea.*

Of 5. and 6. the labels are evidently transposed; that which ought to bear the former comprises eight specimens of *U. linza, Fl. Dan.*, their apices turned downwards, and curiously placed together so as to look like a base, their roots all pointing upward. This is not badly represented in the figure. Of No. 6. there are

two

two specimens, both long and narrow pieces, the one of *U. lactuca,* the other of *U. umbilicalis.*

7. *U. intestinalis* in many different stages.

8. Several specimens of *U. compressa,* unbranched, varying in thickness: these do not agree with the figure.

9. *Fucus opuntia. Linn. Trans.*

10. *U. incrassata. Fl. Ang.*—Dr. Roth has quoted this to his *Rivularia Cornu damæ,* but it belongs to his *R. endivifolia.*

11. It would be difficult to determine what Dillenius really intended by this number: there are three specimens; one, *Conferva gelatinosa β.*; a second, called "*green,*" *C. confragosa*; and a third marked "*var.*" *Ulva plumosa.*

12. *U. crispa. Fl. Scot.*

13. I have no means of ascertaining how far this is the *U. cornuta* of Lightfoot; but I am almost certain it is no *Ulva,* but either a *Tremella,* or, what I rather incline to think, a *Clavaria.* It does not bear the slightest resemblance to *Jungermannia pinguis,* of which Hudson suspected it might be a variety.

The four remaining species enumerated by Dillenius undoubtedly belong to the genus *Tremella*; and I, therefore, from a consciousness of my ignorance in that tribe, decline offering an opinion upon them.

USNEÆ.

No. 10. *Lichen chalybeiformis. Linn.*—It does not appear to differ in any respect from No. 7., which is *L. jubatus.*

16. Under this number is preserved only the narrow orange-coloured *Lichen vulpinus,* which grows in England. That which is known under this name in Germany, and which has lately been found by my valuable correspondent Dr. Flügge, with fine dark shields,

shields, is a distinct species. Of this I saw no specimen in the *Dillenian Herbarium.*

Of Nos. 17. 18. and 19. there are no specimens.

CORALLOIDES.

No. 2. Does not belong to *Lichen byssoides*, as is justly observed in *English Botany*, but is one of the varieties of *L. pyxidatus:* the proper reference is in that work to No. 4. for *L. byssoides;* but No. 5., which is there made the *var.* β., is *Lycoperdon equinum* figured in Sowerby's *English Fungi.*

Of No. 7. the tubercles, instead of preserving their beautiful scarlet colour, are, except in one solitary instance, quite black. Can this be the effect of age, or did Dillenius consider the individuals with red and brown tubercles as the same species?

12. (*L. alcicornis. Achar.*) under A. comprehends Mr. Dickson's *L. endivifolius,* and has at the ends of the leaves some of those black spots which he and Micheli have considered as the fruit.

Of 15. there is no specimen.

20. Appears only a small variety of No. 19., and this does not seem in the least to differ from No. 7. (*L. cocciferus*).

23. and 24., to which authors appear to have made no references, are both singular proliferous varieties of *L. uncialis.*

Specimens of Dr. Acharius's *L. sterilis* are mixed with No. 34., which is *L. fragilis, Linn.*

LICHENOIDES.

No. 4. Under this number are preserved three specimens; one of *L. vernalis,* and two of *Sphæria gregaria.*

6. Has no crust, and appears clearly to be a *Fungus.*

Under No. 7. are mixed two different species of *Sphæria.*

Of

Of No. 8. there are several specimens, only one of which is in fruit: this is the same plant as is preserved in most English Herbaria under the name of *L. calcareus*, but is very different from that so called by Weis and Hoffman, though, perhaps, not specifically distinct from *L. contiguus, Hoffm.* The specimens not in fruit appear to belong to *L. varians, Davies.*

15. A. Here, with several specimens of *L. ater*, are preserved one of *L. subfuscus* and one of *L. parasemus*. B. is *L. scruposus*, as is already well known.

16. This number, besides *L. subfuscus*, comprehends a specimen marked "*sine limbo*," which is *L. ferrugineus, Huds.* and another marked "*e muro*," which is *L. epipolius, Achar.*

34. and 35., made by Lightfoot varieties of *L. tremelloides*, appear to belong with more propriety to *L. sinuatus*.

Of 40. 41. 47. 48. and 58. there are no specimens.

60. (*L. fucoides, Dicks.*) seems evidently only a small variety of the following, No. 61., (*L. fuciformis, Dicks.*) of which there are four specimens: three of these exhibit an appearance quite unknown to, or at least unnoticed by, modern botanists, being copiously furnished at their margins with small, round, sessile, concave shields, black in the centre, with a thin elevated white margin.

62. A. appears to be a narrow variety of *L. scopulorum, Fl. Dan.*; B. is *L. scopulorum*, with its common appearance; C. *L. fastigiatus, Achar.* It is to this number Linnæus has referred for his *L. calicaris.*

Of 64. 65. 66. 67. and 68. there are no specimens.

71. *L. pulverulentus* of *Schreber.* A single specimen, among many others, without any letter subjoined to it, has black shields, and appears a distinct species, the same as No. 72., which Hudson joined with No. 71., referring both to the β. of *L. stellaris.* Dr. Acharius has far more properly separated them.

73. *L. affinis.*

73. *L. affinis. Dicks.* From the description in the *Historia Muscorum*, it must be concluded that Dillenius, like most other botanists, confounded this with *L. plumbeus, Fl. Scot.*

75. Not *L. centrifugus, Linn.* but *conspersus, Achar.*, as quoted by that learned author.

77. and 78. both belong to *L. olivaceus*, differing only in the edges of the scutellæ being smooth in the one and ciliated in the other.

Of 79. there is no specimen; nor is there of 82., the famous *L. ampullaceus*; which is very singular, the circumstances attending its being stolen, and afterwards restored by Professor Von Jacquin to Dr. Sibthorp, being sufficiently known to the botanical world. It is, I believe, now satisfactorily ascertained that the plant is only a variety, or rather *lusus naturæ*, of *L. glaucus*; but still the replacing of the original specimen in the Herbarium as a curiosity, and almost an unique, is very much to be desired.

From No. 84. to No. 95., inclusive, the specimens are all wanting; of Nos. 110. and 112. there are no specimens.

117., referred by Acharius to his *L. hirsutus*, is *L. murinus* of that author: Dr. Withering on this number rests his *L. Dillenii*; so that these two plants are to be joined.

The specimens of Nos. 132. 133. 134. and 135. are wanting.

SPHAGNUM.

Nothing like capsules, nor like what Dillenius took for capsules, now remains on the specimens of *Sphagnum alpinum, Linn.* preserved in the Herbarium: from the observations, however, of the Rev. H. Davies, who examined it while they were still in existence, I am authorized to say, that what Dillenius considered the fruit was certainly not so, nor had it any real connexion with the plant. From what I observed myself last summer in the neighbourhood

bourhood of Snowdon, I am inclined to think it probable he was deceived by some old flowers of *Erica vulgaris* falling among the *Sphagnum*.

FONTINALIS.

No. 2. *Fontinalis minor, Linn.* agrees exactly with specimens of Hedwig's *Trichostomum fontinalioides* sent me from Germany.

HYPNUM.

No. 4. *Hypnum acacioides, Linn.*—I could find no difference, except in the shortness of the peduncles, a circumstance most probably accidental, between this and Mr. Dickson's *H. asplenioides.*

6. *H. sylvaticum, Fl. Ang.* seems, as Hedwig suspected, to be merely a variety of the preceding number (*H. denticulatum, Linn.*); and No. 9. differs in nothing but its darker colour. This last Linnæus described in the *Species Plantarum* under the name of *H. ornithopodioides,* but evidently depended wholly upon Dillenius.

19. A., which Hedwig supposed to belong to his *H. crista castrensis,* appears to be his *H. filicinum,* and B. C. D. E. F. his *H. commutatum:* but I speak with much diffidence, not being at all convinced that I understand the specific difference between these plants.

20. Dillenius has under this number joined Hedwig's *H. crista castrensis,* and *molluscum*; the former sent him by Haller, the latter found in England. Linnæus, Hudson, and others refer all this number to their *H. crista castrensis*; but it certainly includes two very distinct species.

24. Reference is made in the *Species Muscorum* to A. and B. of this number only under *H. rugosum*; but by the Herbarium, Mr. Dickson appears to be clearly right in referring the whole to that species.

 32. *H. prolixum,*

32. *H. prolixum, Dicks.* seems to differ from the preceding number (*H. riparioides, Hedw.*) only in having grown in a situation where it was drawn by the current to a greater length.

37. Dillenius appears to have mixed under this number specimens of *H. lutescens* and *nitens*; the former, "*e Monte Weddenberg*," the latter "*e pratis uliginosis circa Gissam.*"

39. Can hardly be any thing more than a small variety of *H. squarrosum.*

52. *H. murale, Dicks.*---I could discover no difference between this and *H. confertum, Dicks.*

64. This number has been uniformly quoted as *H. serpens, Linn.* and the figure appears to have been taken from that species; but I am much mistaken if all the specimens do not belong to *Leskea subtilis, Hedw.*

Of 72. and 73. there are no specimens.

BRYUM.

No. 4. Hudson has referred this number to *Splachnum vasculosum, Linn.* and Mr. Dickson to his *S. ovatum*; but the specimens agree with his *S. gracile.*

16. A. and B. are *Dicranum scoparium*; C. *Dicranum polysetum, Swartz.*; and D. a species not yet described, which is to appear in the *Flora Britannica* under the name of *Dicranum majus.*

27. Of this number, B. C. D. E. are *Trichostomum canescens*; A. F. G. *Trichostomum heterostichum.*

41. *Bryum polyphyllum, Dicks.*; widely different from *Fissidens polycarpos, Hedw.* with which Hedwig and Hoffman have united it.

Having now concluded my remarks upon the Dillenian Herbarium, I must further trespass on the indulgence of the Linnean Society, by observing that, when I began these observations, the

idea

idea which most forcibly occurred to my mind was that of their necessarily imperfect nature; but, on reading over what I have written, I am far more struck with the apparent presumption of undertaking thus freely to comment upon the works of the most celebrated naturalists that ever lived. I trust, however, the Society will agree with me, that this presumption exists only in appearance; for I have done nothing more than observed what, had they enjoyed a similar advantage, they would themselves have observed long since, and the difficulty* of conveying an adequate idea of a plant by descriptions, or sometimes even by figures, is too great for it to be possible for the most accurate observer always to avoid mistakes in references. I have indeed one satisfaction, which is the consciousness that I incur no risk of a charge of detraction; for Dr. Roth, the author whose works have most frequently fallen under my notice, ranks too highly as a botanist, and has too many claims upon my esteem as an individual, to leave any apprehension of such a suspicion. I will only add that, spite of the progress made in our knowledge of the class *Cryptogamia* since the days of Dillenius, the excellence of his *Historia Muscorum* is so great, and its utility to every student so indispensable, that, as the work itself is become extremely scarce, although impressions of the plates may far more easily be procured, I do not think any botanist, who has sufficient leisure for the undertaking, could engage in a more necessary task than the re-publication of the letter-press, adding specific names and descriptions from the writings of Linnæus, Roth, Hedwig, and Acharius.

YARMOUTH,
6th April, 1803.

* This difficulty is far greater among the *Confervæ* than among the *Musci*, or any other part of the *Algæ*, unless high magnifying powers are employed: for want of these, and of colouring to his plates, they are in many instances absolutely useless.

 XI. *Description*

XI. *Description of some Fossil Shells found in Hampshire.*

By William Pilkington, Esq. F.A.S. & L.S.

Read May 3, 1803.

On looking over the excellent collection of Hampshire Fossil Shells made by the indefatigable hand of my friend Mr. J. T. Swainson, Fellow of this Society, in his frequent visits to Hordwell Cliff, and observing several, which from accurate examination of the plates published by Mr. Brander, and of the descriptions on this subject made by our most celebrated naturalists, appeared never to have been either figured or described, it occurred to me that it might not be thought unacceptable to the Linnean Society if I attempted to lay before them sketches of a few of such of these Fossils (with a specific character of each shell) as presented themselves to be most strikingly different from those heretofore made public. Intelligence, however insignificant in itself, may be of some utility to natural history under the patronage of an institution professedly formed for bringing to light objects the most trifling, as well as those which nature has appeared to be more particularly proud of distinguishing as works of admiration.

Tab. XI. Fig. 1.

Voluta (*Anglica*) testa oblongo-ovata, oblique striata, columella biplicata.

Testa $\frac{5}{8}$ poll. longa, $\frac{1}{4}$ poll. lata.

Anfractus tres.

Fig. 2.

W. Pilkington del. 1803.

Fig. 2.

Buccinum (*defossum*) testa subturrita, transversim sulcata, longitudinaliter costata, apertura ovata, labro margine dentato.

Testa vix pollicem longa, $\frac{1}{2}$ poll. lata et ultra, sulcis distinctissimis, costis tenuibus obsoletioribus.

Anfractus quinque.

Columella calloso-replicata.

Cauda brevis.

Fig. 3.

Murex (*punctatus*) testa subturrita, transversim punctato-lineata, longitudinaliter undulatim striata, labro intus striato.

Testa $\frac{3}{4}$ poll. longa, ultra $\frac{1}{4}$ poll. lata, crassiuscula.

Anfractus octo-decem, fere carinati.

Apertura ovato-oblonga, desinens in canalem linearem.

Cauda subulata, brevis.

Fig. 4.

Muricis asperi (*Brander*) varietas. Costæ pauciores, magis distinctæ.

Fig. 5.

Murex (*interruptus*) testa subturrita, ventre sulcis tranversis indefinitis, anfractibus superne bisulcatis.

Testa poll. $\frac{5}{8}$ longa, ultra $\frac{1}{4}$ poll. lata, sulcis versus anfractus gradatim evanescentibus.

Anfractus sex septemve, plani, nisi in parte superiore.

Apertura ampla striata, desinens in canalem subadscendentem.

Cauda subexcurvata.

Fig. 6.

Murex (*scopulorum*) testa subovata, decussato-sulcata, apertura dentata et margine fimbriata.

Testa poll. $\frac{5}{8}$ longa, ultra $\frac{1}{4}$ poll. lata; sulci transversi stria interstincti.

Anfractus

Anfractus sex.

Apertura ovata, desinens in canalem.

Cauda brevis, truncata.

Fig. 7.

Muricis porrecti (*Brander*) varietas, cauda subincurvata.

Fig. 8.

Murex (*nitidus*) testa turrita caudata, anfractibus carinis duabus acutis, linea duplici punctata interstinctis.

Testa $\frac{5}{4}$ poll. longa, $\frac{1}{4}$ poll. lata, longitudinaliter delicatissime striata.

Venter eleganter costatus.

Anfractus octo.

Apertura linearis, superne paullo latior.

Cauda vix recta.

Fig. 9.

Turbo (*sulcatus*) testa turrita, umbilicata, transversim sulcata, anfractibus superne angulatis, apertura obovata intus striata, labro acuto.

Testa $\frac{1}{2}$ poll. longa, $\frac{3}{4}$ poll. lata, longitudinaliter exquisitissime striata.

Anfractus sex, canaliculo lato superne ex apice decurrente.

Umbilicus parvus.

Fig. 10.

Nerita (*Hantoniensis*) testa umbilicata, ovata, glabra, transversim obsolete striata, umbilico amplissimo profundo.

Testa longitudine $\frac{3}{4}$ poll., latitudine fere eadem.

Anfractus quatuor, planiusculi.

Apertura lævis.

Labrum interius supra umbilicum explanatum.

Umbilicus striatus.

XII. *An*

XII. *An Historical Account of Testaceological Writers.*

By William George Maton, M.D. F.R.S. & L.S. and the Reverend Thomas Rackett, M.A. F.R.S. & L.S.

Read February 1, *April* 5, *May* 3, *and June* 21, 1803.

EXPERIENCE having fully evinced the necessity of system in describing natural objects, it has always been an useful and pleasing task to trace its formation and progressive improvement: and though, until Linnæus drew the outlines of his *Systema Naturæ*, there were no plans of *universal* arrangement to which modern inquirers can feel much interest in turning their attention; yet, with respect to *particular* branches of natural history, we shall find no one that has not engaged the labour of studious men from the very infancy of learning, and that has not, in its progress towards perfection, called forth every variety of talent. Thus the vegetable kingdom, in the contemplation of which mankind in every age have placed one of their purest pleasures, is seen to have employed the pen of science in a multitude of attempts at method, giving rise to a diversity of details and discriminations, and gradually increasing its claims to importance through an endless series of authors. Aware of the advantages which must always result from the review of successive systems, and from digesting the claims of those who had preceded him, the great Swedish naturalist presented us with an excellent model for this species of history in his *Bibliotheca Botanica.* If botanical writers deserved this enumeration of their labours, and if the science

science itself could obtain so valuable a register from the hands of its illustrious reformer, we may be allowed to express our wonder at a similar history of authors not having been executed, as an aid to all other departments of natural history.

It is now some years that the writers of this paper have devoted much attention to the study of the *Testacea*; and in preparing a systematic catalogue and description of such species as inhabit the British islands, they had much reason to lament being unprovided with any professed and complete history of this branch of zoology, to assist them in collecting synonyms and comparing figures and descriptions. Excepting the *Fundamenta Testaceologiæ*, contained in the *Amœnitates Academicæ*, there is no work that exhibits the progress of the science, or treats of the merits of writers, at all in a satisfactory manner. In order to supply this defect, so far at least as our own means of research have extended, and with a view to some explanation of the references which we may have occasion to employ in a future paper, the following sketches are submitted to the Linnean Society. With regard to the order of them, the chronological has appeared to us to be the most eligible; but, as a methodical classification of authors may also be useful, subjoined to the historical part of this paper is a list of their names and works, arranged according to the subjects of which they treat. We have omitted, however, mere *catalogists*, and such authors as have treated of the *Testacea* only in a casual manner, conceiving that an enumeration of such performances would protract this paper to an undue length, without adding any thing particularly curious or important to the history of the science. If several authors of a higher order have not been inserted, it is either because they are not accessible to the generality of our countrymen, or because they have copied others too nearly to be allowed the merit of originality.

With

With respect to the general execution of our task, it is incumbent on us to solicit the indulgence of this learned Society, by whom we hope those deficiencies will be pardoned which have not proceeded from neglect of means of information within our reach.

ARISTOTLE,

the illustrious father of system in general, seems to have been also the first writer, and the inventor of method, in Testaceology. In his *History of Animals* (book iv. ch. 4.) we find a copious description of that tribe to which he has affixed the term Οςρακοδερμα, a term apparently intended to include all such animals as are contained in a shelly covering. It is remarkable enough, that the very first attempt to reduce the species of this tribe under a regular system was so far successful that its outline stood the test of subsequent discoveries, and was retained in Testaceology to a late period. It was Aristotle who formed the divisions of

1. Univalves,
2. Bivalves, and
3. Turbinated Shells;

and the terms which he applied to several subdivisions, or *genera*, remain, as well as the *genera* themselves, in all modern systems. The terms *Lepas*, *Solen*, *Pinna*, and *Nerita*, may serve as examples. Of the animals themselves, distinctly from the shells, this philosopher (as might naturally be supposed) possessed but a very imperfect knowledge; yet he saw the necessity of connecting the structure and habits of them, as far as was possible, with the form of their coverings, in the framing of a scientific system. Thus, in his *genera* of *Cocalia*, *Purpuræ*, and *Buccina*, he expressly describes the head and flesh of the included reptiles. Aristotle's merit, however, was only that of having established some philosophical and permanent distinctions. The number of shells known

in those ages was very confined; many of the mere appendages of testaceous animals, such as *opercula* and detached valves, were mistaken for distinct species; and a variety of families were constituted on the most absurd principles. Yet, with all these defects, Testaceology experienced no improvement from the great Roman naturalist

PLINY,

who is chargeable with a greater fault than that of having left no better an arrangement than he found, for he seems scarcely to have adopted any arrangement at all. In the 9th book of his *Natural History* he gives a pretty diffuse description of Testaceous animals, but in a very vague and unmethodical manner. In Pliny's time the Romans must have had considerable opportunities of increasing their knowledge of shells, for their navigation had been much extended; and with respect to the Mediterranean in particular, their augmented acquaintance with its coasts must have been the means of importing into the capital of the world a great variety of new species. The manner in which this diligent naturalist alludes to the diversified form, colour, and magnitude of these beautiful objects, sufficiently shows that he had viewed no small number, and that he found in them ample sources of interest and admiration.

It ought to be remarked, that there are commentators who have bestowed particular attention on that part of Pliny's works of which we have been treating, and whom the curious scholar may do well to consult. Among these L. Gronovius, Franciscus Massarius*, and Klein, deserve respectful mention. There are also some annotations in the *Leipsic Commentaries* for 1773†, illustrative of the Roman naturalist's terminology.

* Basil, 1537, 4to. † Fischer. p. 487.

ÆLIAN

ÆLIAN

does not omit the Testaceous tribe in his work Περι Ζωων ιδιοτητος: but that philosopher's knowledge of the habits of these animals was of course very limited, and the chapters dedicated to such subjects are, therefore, very concise. It ought, perhaps, to be mentioned, that the distribution of his matter is still more vague than that of his predecessors, and much superstition is mixed with it.

After the dark ages, one of the earliest writers on the subject of natural history was

VINCENTIUS

(a Dominican monk of Beauvais); but he does not treat of any branch of that science otherwise than specifically, attempting no general arrangement, nor dividing his work otherwise than into books and chapters. His "*Speculum Naturæ,*" in the vast compass of its curious matter, contains descriptions of a few of the more remarkable shells, as the *murex*, *purpura*, *ostrea*, &c. but they are borrowed chiefly from Aristotle and Pliny, and are replete with the absurd and superstitious notions of the times. The year following

ALBERTUS MAGNUS

published his volume "*de Animalibus,*" &c. in which are similar scattered descriptions of various shells, without any scientific order, or much original information.

ADAM LONICERUS,

in his "*Historiæ Naturalis Opus novum,*" introduces figures of shells, and describes a few species under the heads of *Cochleæ* and *Conchæ:* but he is extremely concise; a circumstance for which

he apologises, by remarking, that persons who reside in the vicinity of the sea are alone competent to attempt a full description and a scientific discrimination of the *Testacea.*—We have next to mention

BELON,

famous for his travels in the East, and who was, perhaps, one of the first learned men that travelled with a particular view to natural science. In 1553 he published at Paris an octavo volume "*de Aquatilibus,*" accompanied by figures, among which are a few shells not incorrectly represented, but the description is scanty and superficial. The succeeding year

RONDELETIUS

(Professor of Physic at Montpelier), whose situation had given him many opportunities in this way, published on the same subject in a work bearing the title of "*Universa Aquatilium Historia.*" In the second part of this work he has described and figured upwards of one hundred species of Testaceous animals. He has quoted largely from Aristotle and Pliny, interspersing his descriptions with philological remarks, which are, in many instances, more copious than those which relate to the nature of the creatures themselves.

In the different editions of the Commentaries of

MATTHIOLUS

the cuts are very different, both in accuracy and dimensions, and still more so in number. The first edition of this work contains figures of only nine species of shells; the blocks seem to have been afterwards borrowed by the Spanish booksellers (a practice very common at that period), and hence the figures of the Salamanca edition of 1566 are the same. In the Italian edition of 1565 some

some of these figures were omitted, and some new ones introduced, so as to render the whole number fourteen, and they are considerably larger than the former. In the Lyons edition of 1572, by des Moulins, some of the species contained in that of 1554 are introduced (but with the omission of one contained in the edition last mentioned), and the figures are all original. They were copied by the Venetian publishers in 1621, but were in some instances transposed and reversed. Bauhin, in his publication of this work, copied pretty accurately that of 1572, so far as the figures are concerned; as did also Pinet, who, however, reduced the size of them very considerably, and inserted only ten species. The edition of 1683 we have never seen. Matthiolus is pretty copious in his descriptions of the shells mentioned by Dioscorides, but they are derived chiefly from the perusal of authors whom we have already mentioned.

GESNER.

In 1558 appeared the work of Conrad Gesner "*de Piscium et Aquatilium Animantium Historia*," in which may be found all that was known by the antients, and by this author's immediate predecessors, relative to *Testacea*. Well might Boerhaave bestow on Gesner the appellation of "*Monstrum eruditionis*,"—an appellation to which this indefatigable writer was justly entitled, for the extent of his learning, and the excellence of his comments on the writings of antiquity. His figures of shells are, for the most part, extremely rude; but, in general, the species intended to be represented may be pretty readily recognized, and they are accompanied by very ample descriptions. In the "*Icones Animalium*" of this author we find several shells of the Indian and Arabian seas, which had never been figured before, and which prove that he was not content, even in a part of his work comparatively so in-

considerable,

considerable, to detail what was known by his predecessors, without making additions of his own. With regard to system, Gesner trod pretty nearly in the steps of Aristotle. In making a fourth class, denominated *Anomala*, he can scarcely be said to have *improved* the arrangement of the Grecian philosopher; and even if his *genera* of *Balani*, *Penicillæ marinæ*, *Tubuli marini*, and *Echini*, can be considered as more properly placed here than in any one of the Aristotelian classes, it was certainly very injudicious to include the *Stellæ marinæ* and *Medusæ* among Testaceous animals.

LINOCIER,

the well-known copyist of Gesner, gives a brief account of a few shells, with figures, in his "*Histoire des Poissons.*"

IMPERATO.

Francesco Imperato was the editor of a work on natural history composed principally by his father. The figures, which are far from being either rude or incorrect, relate principally to fossils: they are few in number, but the description of shells occupies several pages, and, though devoid of system, proves the author to have paid considerable attention to this branch of zoölogy. Besides giving the labours of his father to the world, Francesco published two treatises of his own, one entitled "*de Fossilibus Opusculum,*" and another, "*Discorsi intorno a diverse Cose Naturali.*" Both of these came from the press at Naples, and deserved, as well as the work first mentioned, to be considered as very respectable additions to the scientific literature of that day. The treatise on Fossils contains some figures under the correspondent descriptions; but the miscellaneous work is destitute of any, and indeed does not treat particularly either of recent or of fossil shells.

ALDROVANDUS

followed the disposition of shells adopted by Gesner, except that he inverted the order of the classes, and altogether omitted the objectionable one of *Anomala*. His work "*de Mollibus Crustaceis, Testaceis, et Zoöphytis*," is divided into four books. The figures are coarse and inaccurate, and less fit for reference than those of, perhaps, any other of the older writers on this science.

COLUMNA.

The treatise of Fabius Columna is to be considered rather as a *Monographia* of the *Purpura* than as referable to shells in general; but it contains descriptions of a few rarer species, and of some fossils also, which are all neatly figured in seven copper plates, exclusive of the one attached to a dissertation on *Glossopetræ*.

This work was re-published in 1675 by John Daniel Major, M.D. whom we shall notice hereafter.

In the same year with Columna's Treatise on the *Purpura* appeared the excellent plates of

BASIL BESLER

(apothecary of Nuremberg), well known among the naturalists of that period, particularly for his attachment to botany. These plates are highly finished, and perhaps altogether superior to any that had appeared before on copper relative to subjects of natural history. Two of them only contain figures of shells, the lovers of which must lament that there are no more, so elegantly and correctly are they executed. There are specific descriptions in Latin and German. The work has for its title "*Fasciculus Rariorum*," &c. and, though inconsiderable in its extent, well deserves a place in the library of the curious naturalist.

CHIOCCO.

CHIOCCO,

the describer of the "*Museum Calceolarium*," gives a very full account of the shells contained in that collection, with specific characters, in the Latin language. These descriptions, however, are for the most part borrowed from other writers. The book itself must have been looked upon in those days as very superb and expensive, and was certainly worthy of the museum which it professes to describe. This museum was begun by Benedict Ceruto, a physician, and even before it received additions from Calceolari, contained an immense assortment both of natural and artificial subjects. The figures of the shells occupy six plates, and are very correctly executed. It appears to be the first work that was written professedly as a *description* of a museum of natural curiosities, if we except OLIVI'S account of the same collection, which, however, is very vague and imperfect.

The forming of collections began about this period to be undertaken by many curious persons, especially in Italy and Germany, countries where, in common with other branches of science, natural history first attracted attention, after the revival of letters.

SCHONVELDE

(a physician of Hamburgh) was author of an account of marine, lake, and river animals found in the duchies of Sleswick and Holstein, which contains separate chapters on oysters and muscles, *pectunculi*, and *pediculi aquatici*. The work is of a very superficial nature, and relates chiefly to the culinary uses of the animals.

NIEREMBERGIUS

may be included in our list, as having given some account of various *Testacea* in his "*Historia Naturæ*;" but he does not present us with

with figures of any species, nor are his descriptions on this subject at all full, except where he treats of pearls.

About twenty years after the publication of the *Museum Calceolarium* there appeared a performance of a similar nature in the "*Gazophylacium Rerum Naturalium*" of

MICHAEL RUPERT BESLER

(the brother of Basil), whose plates were in the first edition twenty-four in number, representing, among other subjects, a few figures of shells, some of which, however, are formed artificially into ridiculous similitudes of human heads, &c. There is a concise description in Latin under the respective figures. In the second edition, the number of plates was augmented to thirty-five, with a German preface; but in this, as in the former publication, the majority of the subjects relate to artificial curiosities. Nothing can be more incommodious than the size of the book, which is almost twice as large as that of the copper-plates.

The museum of

WORMIUS

contained many species of *Testacea:* but the author vouchsafed figures of none of them, except *Lepas anatifera*; and this was one that might well have been spared, being copied from Marcgrave's *Nat. Hist. Brasiliæ*, which is referred to by Linnæus for that species. Connected with it we have the whole of the ridiculous story, so generally received by the credulous naturalists of that day, respecting the *Barnacle Goose.* Chapters 6, 7, and 8 of the "*Museum Wormianum*" relate entirely to shells, divided, according to the Aristotelian classification, into *Univalvia*, *Bivalvia*, and *Turbinata.*

The volume of which we have been speaking was preceded by the synoptic catalogue of SEGER, printed at Copenhagen in 1653.

An account of the collection of natural curiosities belonging to an Italian nobleman of the name of

MOSCARDO

made its appearance at Padua. Several species are figured in this work, those of shells occupying twelve copper-plates, but they are not very elegantly nor correctly represented. There are no *general* descriptions, the subjects being noticed only specifically.

There was another edition of these *Note* published in 1672 at Verona (the city where Count Moscardo resided). This contained some wooden cuts besides the copper.

JONSTON

(who was a great compiler and copyist with regard to description) deserves but little credit, except for the number of his figures, which were also more highly finished than had hitherto been customary in these branches of pursuit. His "*Historia Naturalis de Exanguibus Aquaticis*" contains twenty copper-plates of *Mollusca* and *Testacea*, but there is no regular distribution of the individual figures, nor any remarkable accuracy in their design.

This author describes a few of the more remarkable shells in his *Thaumatographia Naturalis*, printed in 1665.

POWER

gives a pretty full account of the structure of *Helix lucorum* in his *Exp. Philosophy.*

DE ROCHFORT,

author of the *Histoire Naturelle et Morale des Isles Antilles*, is pretty full in his description of the shells of those isles, but with no pretensions to system. His 19th chapter is illustrated by a

pretty

pretty accurate plate of five of these, which he considered as most remarkable for their beauty and shape.

In 1666 the museum of the Duke of Holstein-Gottorp was described by

ADAM OLEARIUS.

A second edition of this work came out in 1674. Each is embellished with thirty-six remarkably neat and good copper-plates, five of them containing shells, which are referred to by Linnæus in various parts of his *Systema*.

DU TERTRE,

who succeeded this author in the same undertaking, has done little more than having corrected what he considered as mistakes in his predecessor, with respect to the natural history of the Caribbee shells, but his work is three times as large.

MERRETT,

though scarcely entitled to the character of a describer, seems to deserve a place in our account of Testaceological writers, as having been the earliest catalogist of the natural productions of Great Britain. The *Testacei* (as he calls them) occupy but little more than a page of his *Pinax*, and his references are only to Rondeletius, Gesner, Aldrovandus, and Jonston.

CHARLETON

is to be considered rather as a nomenclator than as having any pretensions to the rank of a systematical writer, yet he constructed some subdivisions of his own in the classes before established. He separated the *Turbinata* and *Bivalvia* into two orders, which are very ill conceived, especially those of the last mentioned

tioned

tioned class, the distinctions of *Conchæ asperæ* and *læves* occasioning the disunion of several obvious natural *genera.* The "*Onomasticon Zoicum*" certainly deserves respectful mention, inasmuch as it was the earliest production of the kind that was published in England. The author, who was a physician of considerable learning and celebrity, had before distinguished himself in the science of natural history by his "*Exercitationes de Differentiis et Nominibus Animalium,*" published at Oxford in 1677.

STENO

cannot, with propriety, occupy a place in our historical account of Testaceological writers on any other ground than that of having been the author of several curious remarks on the mode of formation of shells. These remarks occur in a work, the title of which certainly does not indicate any connexion with them, viz. "*De Solido intra Solidum naturaliter contento Dissertationis Prodromus.*" It is (properly speaking) a treatise on crystallography, but contains some pages on the subject of shells that are highly deserving of attention, as they form the earliest attempt to explain in a scientific manner the fabric and texture of testaceous bodies.

BOYLE,

our celebrated countryman, is not undeserving of mention here, having made experiments on the phænomena of shell-fish (particularly of the *Ostrea edulis*) under an exhausted receiver; which experiments are described in the *Philosophical Transactions* (vol. 5. p. 2023.) of the year 1670. It is but right to regard whatever elucidates the nature, even of a solitary individual, of the testaceous tribe, as subservient to the accuracy of systematical arrangement; and we shall, therefore, not omit to point out in the course

of

of this dissertation every source of information connected with the history of these animals.

WILLIS,

the celebrated physiologist, has very accurately figured and described the anatomy of the *Ostrea edulis* in his *Exercitationes de Anima Brutorum.*

The annotations of

MAJOR

on the elegant and learned treatise of Fabius Columna have been alluded to before: as the annotator himself was the author of a system, he is entitled to specific mention in the proper chronological place. This system is annexed to a republication of the history of the *Purpura,* together with a "*Dictionarium Ostracologicum,*" the most useful part of Major's performance. He adopted a new and elaborate method of distributing *Testacea,* founded principally on the species described by Columna himself, whose figures (twenty-five in number) are copied in wood-cuts placed in the systematic as well as in the descriptive part: among them are several fossils of the *genera* of *Chama* and *Anomia.* The method, however, is infinitely too complicated and ramifying to admit of any useful application. The dictionary exhibits an explanation of all the terms then employed in Testaceology, pointing out the respective authors by whom they were first introduced, and tracing out, in most instances, the derivation of them. The terminology of modern systems is, evidently, far from being chiefly of modern invention, and it is curious to remark how many of the designations established in the *Fundamenta Testaceologiæ* may be found in the earliest glossary connected with that science, the *Dictionarium Ostracologicum* of Major.

When

When alluding to this writer's system, we ought to have mentioned that, fond as he was of numerous subdivisions, the *classification* (properly so called) is singularly, but not absurdly, simplified, all the *Testacea* being comprehended under the heads of *Univalvia* and *Plurivalvia*. In the latter we find the *genera* of *Conchæ anatiferæ* and *Balani* (united by Linnæus under the name of *Lepas*), which before the time of Major had been very improperly arranged either among the Univalves or the Bivalves.

LEGATI

is to be mentioned in this place as the author of the "*Musco Cospiano*," printed at Bologna in 1677. The basis of the collection distinguished by the above appellation was laid by the celebrated Aldrovandus, who was, probably, the first person that formed a regular museum, and whose handwriting still remains affixed to many specimens that formed the subjects of Legati's descriptions. Ferdinando Cospi, a Bolognese patrician, afterwards augmented it so considerably that his name became attached to it, and the University of Bologna, to which it was afterwards presented, considered it as one of its greatest treasures. In the work of which we are treating, figures of shells are very sparingly introduced, but they have the merit of neatness and of tolerable accuracy. There are ample descriptions of *Testacea* interspersed with critical and philological matter.

SIR ROBERT MORAY

was author of a description, illustrated by a rough outline, of *Lepas anatifera*, from which the credulous knight asserts that young geese may actually be seen to emerge. His "*Relation concerning Barnacles*" occurs in the 12th volume of the Philosophical Transactions.

The

The *Helix lucorum* is anatomically described by

HARDERUS

in a dissertation entitled "*Examen anatomica Cochleæ terrestris domiportæ.*" This author published also a few anatomical epistles (relative to the genital organs of some of the Univalves), which are annexed to his translation of Marsigli's work hereafter to be mentioned.

The museum of the Royal Society of London next acquired the celebrity it deserved from the descriptive catalogue of

GREW.

This was the earliest work of the kind that appeared in our native language. The shells are described in two chapters (the first comprehending Univalves, and the second Bivalves and Multivalves), illustrated by four good plates, each of which contains eight or ten species, with the current English names annexed. There is a general scheme subjoined, which remains a proof of the pains taken by the author; but it is complicated, and exceptionable in many respects. The natural and artificial curiosities at that time possessed by the Royal Society were preserved in Gresham College; they now, as is well known, form a part of our great national collection in the British Museum.

BUONANNI.

Contemporary with Grew was the learned Philip Buonanni, an Italian jesuit, who may be considered as the first author that treated at any length, exclusively, on the subject of shells, and whose figures are very frequently referred to in the *Systema Naturæ.* His work was first printed in his own language, but was

three

three years afterwards put into a Latin form, under the title of "*Recreatio Mentis et Oculi in Observatione Animalium Testaceorum.*" It contains upwards of five hundred figures, not remarkable, however, for their accuracy; the apertures of the Univalves are, in many instances, represented as turning to the left instead of the right. The descriptive part is loose and desultory, and exhibits few marks of scientific distribution, except the general division of the subject into

1. *Univalvia non turbinata*,
2. *Bivalvia*, and
3. *Turbinata*.

In the inferior divisions this author has strangely separated species naturally allied to each other. For instance, the *Serpulæ*, *Dentalia*, &c. are left out of his first class, and, as well as the *Porcellaneæ*, distributed under the third; and, with equal want of consistency, he places the *Haliotis* and *Nautilus* (*genera* manifestly turbinated) among those which he terms *Univalvia non turbinata*. But it should be remarked, as a circumstance highly creditable to Buonanni, that, in many instances, he has given the *loci natales* of his species, which were too little attended to by testaceologists of that age. He has also treated of the formation of shells in a manner more philosophical than could have been expected at such a period. The subjects for his engravings were obtained principally from the famous museum of Kircher, which was afterwards separately described by our author under the title of "*Museum Kircherianum.*" This volume contains forty-six plates and five hundred and eighty-six figures of shells (besides those illustrative of other parts of the collection), and the descriptive and physiological matter of Buonanni's original work.

MARSIGLI.

An elegant little work relative to the *ova* of *Testacea* was published by

MARSIGLI.

It bears the title of "*Relazione del Ritrovamento dell' uova di Chiocciole di A. F. M. in una Lettera al Sign. Marcello Malphigi.*" One plate only accompanies it. We ought to observe that this author makes very honourable mention of our countryman Lister. Some observations on Marsigli's account of these *ova* were published by a few years afterwards FULBERTI, whose work is commonly found in the same volume with the former.

Among the *Observazioni Naturali* of

BOCCONE

there occur some remarks relative to *Testacea*, which are not uninteresting. Boccone seems to be the first author who has described fully the *Lepas diadema* of Linnæus, which, from its been seen adhering to the back of a whale, was denominated *Pediculus ceti*.

An anatomical description of the common muscle was published the same year in the *Leipsic Commentaries* by

DE HEIDE,

which description also appears in Valentini's *Amphitheatrum Zootomicum*.

The purple fish was described at considerable length in the *Philosophical Transactions* by

COLE,

who has taken considerable pains in pointing out the mode of obtaining, and the nature of, this celebrated dye. *Buccinum Lapillus*, the species alluded to by this author, is figured in an annexed plate. This tract was reprinted in 1689, and sold separately.

 LISTER.

LISTER.

There is no name in the annals of natural history that deserves to be mentioned with more respect than that of our countryman Dr. Martin Lister, to whom, in this historical catalogue, we have given the place appropriate to the time of the publication of his *Synopsis*, or general work on shells: but, as this was far from being the first in order of his publications, we shall beg leave to preface our account of it with some remarks on his earlier productions. We may be permitted, perhaps, to be less concise on the subject of this celebrated writer than we have shown ourselves with respect to most of his predecessors, when it is considered that he was the father of British Testaceology, and that in the labour, accuracy, and extent of his works, as well as in the philosophical spirit with which they were executed, he has far surpassed all the writers of that period. His figures, both in point of number and faithfulness, are with reason still held in such high estimation, that no person attached to this branch of natural history can advance in it without the constant use of them, nor without finding them preferable for reference to many *more splendid* engravings which have succeeded them.

The earliest essays of Lister on the subject of the *Testacea* appeared in the *Philosophical Transactions*, that general and useful receptacle for accidental and detached discoveries in natural science, for the preservation of which the Royal Society was instituted, and to which our indefatigable countryman was one of the earliest and most valuable contributors. His first communication was (anonymously) on the subject of heterostrophous shells. At this time he was living at York, whence some subsequent communications were dated, and where he made many of those observations relative to zoology and fossils which formed an important

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tant part of his "*Historia Animalium Angliæ.*" Previous to the publication of this work, however, he exhibited a specimen of his arrangement of the British *Testacea* in some tables printed in the 9th volume of the *Philosophical Transactions*, in which collection nothing of a similar nature had ever before been inserted. The three treatises which composed the History, and which related to spiders, to land and fresh water shells, and to those that inhabit the sea, were published in a quarto volume in the year 1678, with a distinct tract relative to fossils. They were accompanied by twelve copper plates, the first four of which illustrate the descriptions of the insects, and the eight others those of the recent and fossil shells. With respect to system, it must be confessed that the author was far from having attained either simplicity or accuracy; it had for its basis the very unphilosophical distinction of the *abode* of the animals, and in its subdivisions the ramifications were too numerous to be referred to with facility. The paucity of generic terms also formed a lamentable defect. His principal object, indeed, (as he himself informs us in his preface,) was to render the description of *species* as ample and accurate as possible; and he expresses himself with so much good sense and genuine science on this point that we cannot forbear inserting his own words in this place: "*Illud autem* (says he) *in hoc opusculo præcipue institui; nimirum, singulorum generum bestiolas quam accuratissime in species diducere; cujus illa certe singularis utilitas esse possit, ut si quæ in posterum præclara experimenta de his animalibus aliorum industria confecerit, ea tuto huc referri possint, suisque quæque locis recte disponantur. Mihi interea illud satis superque est, ea primum nostra animalia seculo indicasse rerum naturæ studiosissimo. Qui vero simile opus aggressi fuerint, ei tantum intelligant quantum sudavimus, resque adeo minutas vel extrema linea certo cognoscere esse aliquid. Cum autem pleraque, quæ hic habentur,*

T 2 *ad*

ad fidem sensus referri possint, in id maxime incubui ne ipse primum deceptus posteros in errorem ducerem. Summam sane diligentiam adhibui, ut veras species distinguendo, non multiplicando citra necessitatem singulis, minutissimis licet, fidissimis tamen observationibus, quæ ad animalium mores vitamque spectarent, exornarem." Some additional species, with further remarks on many before described, were figured in an "*Appendix*," which went through two editions, the first being published in quarto at York in the year 1681, and the atter subjoined to his edition of Gœdart's Insects. This entomological work was published in an octavo form, with twenty plates, two of which contain figures of shells. The original "*Appendix*" is now become very scarce.

It was in the year 1685 that Lister commenced the publication of his great Testaceological work entitled "*Historia sive Synopsis methodica Conchyliorum*," which was divided into four books, besides a *mantissa*.

Lib. 1. *De Turbinibus terrestribus.*
2. *De Turb. aquæ dulcis et Bivalvibus aquæ dulcis.*
3. *De Bivalv. marinis, et Conchis anatiferis.*
4. *De Patellis, Dentalibus, &c. et de Buccinis marinis.*

The plates (which were 1057 in number) had very different dimensions; in some instances containing a single figure, in others several figures, and not unfrequently more than one distinct *species* on the same plate. Concise descriptions are engraved on most of them, with references, wherever they could be given, to the places whence the specimens were brought. Our author seems to have been principally indebted to the museum of Mr. Courtein for the means of representing and describing those species with which he was not himself provided; but that his own collection was not deficient, either in number or perfection of specimens, is evident from what remains of it in the Ashmolean

museum

museum at Oxford. To this University the plates themselves were also bequeathed, and there they were republished in 1770, under the direction of the *Rev. William Huddesford*, keeper of the Ashmolean museum, who subjoined two *indices*, one connected with Lister's own distribution, and the other with the Linnean, to which last were affixed as many of the current English names as the editor was acquainted with. This edition differs from the former principally in containing several plates on one page: the whole number is 1085 (28 more than are comprehended in the first edition), but there do not appear plates 89, 164, 195, 196, 222, 923, 961, which were contained in the original. The number of figures amounts to no fewer than 1153, exclusive of the fossils and anatomical subjects. These, however, are not to be considered as so many distinct species, since there is, doubtless, a repetition of several, which the author, on account of difference of colour and stages of growth, did not imagine to be the same. We ought not to omit mentioning that the delineations of all these, for the most part so accurate, came from the fair hands of this celebrated naturalist's daughters, *Susannah* and *Ann Lister*, whose names deserve to descend to posterity with their father's, and whose truly meritorious industry and ingenuity are patterns for their sex.

The researches of Lister were by no means confined to the mere coverings of *Testacea*. So far was he from contenting himself with pointing out the beauty and variety of the *shells*, that he not only collected as much as was in his power relative to the habits of the *animals*, but also devoted great pains to the illustration of their *anatomical structure*. He published three separate "*Exercitations*," each exhibiting dissections of *Vermes*, and containing ample descriptions, in Latin. The first "*Exercitatio Anatomica*" relates chiefly to the *Limaces*. Of the second (to which was

was subjoined a dissertation on Small-Pox) the *Buccina* formed the principal subject. The last relates to bivalves: it contains also a dissertation on the human calculus. The "*Anatomy of the Scallop*" formed the subject of a distinct paper, published under this title in the 19th volume of the *Philosophical Transactions*.

FEHR

wrote a dissertation on the *Argonauta Argo*, which is printed in the *Eph. Acad. Nat. Cur.* There is a correct engraving of this species subjoined to it.

The same year an academical dissertation on the *Purpura* was published at Upsal during the presidency of

NORMANN,

El. Bask being the respondent. This contains a disquisition on the purple fish of the antients, but without definitively marking any particular species as being employed by them for extracting the famous Tyrian dye. A wooden cut is prefixed exhibiting three figures, two of which are copied from Jonston (and seem to be referable to *Murex Brandaris*) and the other from Columna.

Some observations in the *Eph. Acad. Nat. Cur.* by

SCHELHAMMER

ought, perhaps, to be mentioned here. Two of this author's communications are on the subject of fresh water shells, and are accompanied by a few figures, which are pretty correctly executed. The author pretends to give only a concise account of some species which he had recently noticed, and it is too imperfect to merit being referred to. A third communication is entitled "*Animal in Cochlea minuta depressa degens*;" this relates rather to the physiology of the animal (a *Helix*) than to the testaceous covering.

The

The *ova* of some species of *Ostrea* were treated of in the same work by

BRACHIUS,

whose observations, however, were very scanty, the account of them not extending beyond three pages.

DU MOLINET,

author of "*Le Cabinet de la Bibliotheque de Sainte Genevieve*," is scarcely entitled to a place among the writers who form the subjects of this paper, his work treating almost wholly of antiquities. Among the plates, however, (which are finely executed,) there is one containing twenty-one figures of shells, which are accompanied by names and concise descriptions in the French language.

In the 17th volume of the *Philosophical Transactions* we find some communications on the subject of shells addressed to Dr. Lister by a naturalist of the name of

BANISTER,

who resided many years in Virginia; but his descriptions are too vague to enable us to ascertain what species he alludes to. In the same volume is a "Description of certain Shells found in the East Indies, communicated to Dr. Lister" by

WITZEN,

who figured many of them, but was not sufficiently precise in his description to enable the reader to determine all the species. The best figure in the plate is that of an *Ostrea* found at Goa.

A similar work to Du Molinet's was the description of the museum of Christian V. king of Denmark, whose librarian,

OLIGER

OLIGER JACOBÆUS,

drew up an elaborate volume, under the title of "*Museum Regium.*" It is a very handsome work, but contains no attempt at system, and the tenth plate is the only one relative to Testaceology: indeed this represents only an ornamental fabric composed of shells. In the new edition published by LAUERENTZEN a few species are added, though in a very indifferent style, and there is not much augmentation of the descriptive part. An alphabetical index, in two parts, one of which relates to the artificial, and the other to the natural subjects, was published in 1726.

SIBBALD,

though best known by his "*Scotia illustrata,*" ought to be mentioned here, as having been the author of a general Testaceological work, bearing the title of "*Auctarium Musæi Balfouriani.*" This work, however, does not treat of *Testacea* exclusively, but comprehends a variety of subjects, both of art and nature, which were contained in the collection of Sir Andrew Balfour, Knight, M.D. —a collection presented to the University of Edinburgh, and considerably augmented by the intimate friend of the donor, who described the whole in the work above mentioned. Unfortunately for the reputation of this University among naturalists, a very small part of the collection is now remaining. "Such," says Mr. Pennant, "has been the negligence of past times, that *scarce a specimen* of the noble collection deposited in it by Sir Andrew Balfour is to be met with, any more than the great additions made to it by Sir Robert Sibbald." (*Scotch Tour*, 1776. *p.* 246.) Such is too often the fate of public collections; and so slight or so transient is any respect for the laudable intentions of generous

rous individuals towards public bodies, that common care is rarely taken to preserve from destruction what escapes the hand of peculation and robbery. But to return to our subject: The description of the Balfourian museum treats pretty largely of the specimens of *Testacea* contained in it, being divided into five chapters, agreeably to something like system. The preface contains an interesting account of the most remarkable *musæa* anterior to the formation of the Balfourian, and also of the works which profess to describe them.

One of the earliest and most elaborate of Sibbald's performances in natural history was his "*Scotia illustrata, sive Prodromus Historiæ naturalis,*" &c. published in the year 1684. The attempt, as it was the first made in that country to describe scientifically its several productions, deserves very respectful mention, and will be a lasting monument of the learning and industry of the author; who, however, whether from finding the undertaking too extensive and laborious, or from being discouraged by some severe criticisms on what he had already accomplished, never executed his intention, to write the miscellaneous history of Scotland in all its branches. He answered some of the attacks made on his work in "*Vindiciæ Scotiæ illustratæ,*" annexed to his "*Miscellanea eruditæ Antiquitatis,*" which were published in 1710, and reprinted, with all his folio works except the "*Scotia illustrata,*" in 1739.

With regard to the Testaceological part of the *Prodromus,* it is concise and obscure, and illustrated only by two plates: the system is founded partly on the principles of Lister, and partly on those of Buonanni.

But this was not the only treatise of Sibbald on the subject of shells, for he was the author also of a work entitled "*Nautilogia; sive Exercitatio philosophica de Nautilis aliisque Conchyliis navigera*

Similitudine ornatis;" and in an appendix to his "*de Aquatilibus Observationes*" he gave a particular description of *Lepas anatifera*, refuting the ridiculous notions entertained at that period respecting this creature.

Sir Robert was contributor of several papers to the Philosophical Transactions. In volume 19th there is an account of some Scotch shells, addressed to Dr. Lister; and in the 25th volume a description of what the author calls *Pediculus ceti* (*Lepas diadema*, *Linn.*) forms part of a letter to Sir Hans Sloane.

The refutation of the absurd story of the Barnacle Goose was undertaken by many writers about this time, and among others by

ERICUS A MOINICHEN,

whose name is prefixed to a dissertation entitled "*Conchæ anatiferæ vindicatæ.*"

In the number of writers who have treated of the physiology of the *Testacea*, the celebrated

LEEUWENHOEK

deserves to hold a distinguished place. His first production on this subject was addressed to the Royal Society, and relates chiefly to the generation of these animals: the *ova* and the intestinal structure of certain *Mytili* are also particularly described. His 95th epistle treats of the *ovaria* of *Conchæ* in general, and is illustrated by some good figures. Another describes the *ova* of different shells. Lastly, in an epistle dated 1717, he gives an account of the tendinous substances belonging to some bivalves; but it is very concise, and introduced only in a cursory manner, when he is treating of the structure of tendons in general.

LEIGH

LEIGH

has figured a few species of *Testacea* in his "*Natural History of Lancashire*," and the figures are not inaccurate; but we find nothing in the descriptive part very worthy of attention.

WALLACE,

also, in his "*Account of the Islands of Orkney*," enumerates such species as had fallen under his notice, describing them chiefly in the words of Lister; and he has figured three of them.

PETIVER.

Though the merit of Petiver was principally that of an ichniographist, yet we are to consider him also as capable of describing the subjects which he collected and figured, with accuracy and science. The *Philosophical Transactions* contain several papers written by him, which show that he considered the study of nature as subservient to more dignified purposes than the mere amusement of the eye, or the ostentatiousness of a museum: those relative to shells are descriptive chiefly of foreign species, and contain the synonyms of Rondeletius, Aldrovandus, Lister, and others of his predecessors, wherever they were applicable. The specimens which he received from the Moluccas are described in the 22d volume of the work we have mentioned, with some additional remarks in the 23d; those from Carolina in the 24th. In the "*Memoirs for the Curious*" we find "an account of bivalves brought from the coast of India." The great assiduity with which Petiver procured animals, plants, and fossils from various parts of the world, caused his collection soon to assume sufficient magnitude and importance for rendering his name well known both at home and abroad; and so highly did the greatest judge of the value of natural curiosities at that period, Sir Hans

 Sloane,

Sloane, estimate the museum of our indefatigable naturalist, that he offered him 4000l. for it some time before his death. The mode by which he was most successful in obtaining specimens consisted in engaging captains and surgeons of ships to bring home whatever appeared to them curious in the countries which they visited, directing their choice and assisting their judgment by distributing among them printed lists and instructions. At length he conceived the design of publishing engravings of the principal rarities contained in his museum, and in 1702 he commenced its execution, in the work entitled "*Gazophylacium Naturæ et Artis.*" This was divided into decads, and illustrated by what he called "classical and topical catalogues," which, however, did not exhibit, any more than the plates themselves, even an outline of scientific order: neither were they any further descriptive than as they pointed out the native countries of the several subjects, and, occasionally, the commonly received appellations. Yet the work acquires considerable value from the accuracy with which most of the figures are executed, and from its having been so frequently referred to by Linnæus; as long as whose writings are consulted the *Gazophylacium* of Petiver must remain in repute. A great number of the subjects had never been figured before, especially of the *Testacea,* some of which have not been duly noticed or referred to in descriptions of the correspondent species until within a very late period. There are about fifty *English* shells among the figures. This useful work was completed in two folio parts, each containing fifty plates, which, in another edition, were increased to the number of one hundred and fifty-six, and they comprehend in the whole three thousand figures. In the same volume with the latter edition of the *Gazophylacium* there are twenty-two plates of Amboyna and East Indian shells, with names, references, &c. and containing above four hundred figures

(but

(but these were copied from Rumphius); also twenty plates illustrative of animals and plants of the Charibbee islands, and entitled "*Pterigraphia Americana.*" The last, indeed, appeared in the original editition, which formed only one volume; whereas the edition of 1764 was, with the various other sets of engravings published by this author, sufficiently bulky to be divided into two.

PLOT,

the author of the "*Natural History of Staffordshire* and *Oxfordshire*," makes some mention in the latter of such *Testacea* inhabiting that county as had fallen under his notice. In his tenth plate we are presented with a figure (viz. 9.) of *Buccinum undatum*, which, if we are to give credit to this author's account, was found alive in Cornbury Park: but it is evident, from his references to Rondeletius and Aldrovandus, that the species found there could be no other than the *Helix Pomatia*. Hence his work should be consulted with great caution.

Contemporary with our countryman Petiver was the celebrated

RUMPHIUS,

not only whose pursuits but whose profession was exactly the same as the former's, as he was originally an apothecary at Amsterdam, where his rich and costly museum acquired the same celebrity as that of Petiver in London. The passion for forming cabinets of natural curiosities, especially of shells, began at this period to be very prevalent in Holland. Rich individuals studied to outvie one another in that country, as much in the expensiveness and extent of their collections, as in the splendour of their equipages and retinue; and the sums which were given for a *Cedo nulli* or a *Wenteltrap* would appear too enormous to deserve belief, if such accounts were not authenticated by the most respectable

able writers of that day. Rumphius himself informs us in his preface to the "*Amboinshe Rariteitkamer*," that a shell described in this work cost no less than 500 Dutch florins.

The book bearing this title contains a description, in the Dutch language, of the more remarkable natural productions of Amboyna preserved in the museum of Rumphius, which are figured in sixty plates, thirty-three of these containing solely shells. The figures were designed by Madame Sybille Merian, so well known by her work on the Surinam insects: they are, in general, correct; but there is a harshness in the engraving which takes off considerably from the beauty of many of the subjects. The description was written by M. Schein Voet, who adopted no very regular method; nor does he appear to have been extensively conversant with preceding Testaceological authors. There was a second edition of the work in 1741; and, indeed, an intermediate publication of the plates by themselves took place, without any letter-press, except a table of Latin, Dutch, and Malabar names. This last-mentioned edition is in more general use than either of the other two.

The great service rendered to science by the industry and liberality of Rumphius, caused him to be received as a member into most of the learned societies of Europe: in that of the *Naturæ Curiosorum* of Germany he obtained the appellation of *Plinius Indicus*, which was richly merited by the vast accession to our knowledge of the productions of that part of the world made by his own researches, and displayed in his magnificent publications. In the *Ephemerides* of the illustrious academy just mentioned appear two dissertations on Testaceological subjects from the pen of Rumphius: the first, "*de Ova Marino, Porcellanis, seu Conchis venereis*," is illustrated by very good figures of *Bulla Ovum* and *Cypræa Arabica*; and the second, "*de Nautilo remigante et velificante*,"

cante," by a plate representing *Argonauta Argo* in the act of sailing. The author, it seems, was enabled to give an accurate account of the construction and movements of that wonderful animal from personal observations, on the Indian seas.

In the memoirs of the Royal Academy of Sciences at Paris for 1706 occurs one of the most excellent Testaceological dissertations that had ever before appeared; it was the composition of the celebrated anatomist

POUPART,

and had for its subject the physiology and pathology of the Muscle tribe. The anatomy, habits, and diseases of several species of *Mytilus* are amply and scientifically described, and there are some accurate figures in two plates subjoined. M. Poupart had before distinguished himself by a dissertation on the motive power of an aquatic *Helix*, which was published in the "*Journal des Sçavans.*"

One of the most distinguished Dutch collectors, contemporary with Rumphius, was

LEVIN VINCENT,

the description of whose museum, however, scarcely deserves to be spoken of here, since it is composed in too general and popular a manner to be of any utility to a scientific naturalist; and the plates (which, notwithstanding, are well executed) represent the several objects in a confused manner, as they were placed in the museum itself: yet a few species of shells, as well as of other natural curiosities, may be pretty easily discriminated. The description we allude to is entitled "*Wondertoonel der Nature,*" and was published, wholly in the Dutch language, at Amsterdam in 1706. But this work was afterwards given, in an abridged form, in Latin and French, with impressions of the same plates.

The

The "*Philosophical Transactions*" of our own country for the following year contain an account of some of the shells of the Philippine Islands, communicated by Petiver from

KAMEL,

many of whose papers occur in that work, and who illustrates his descriptions by references to the plates published by his correspondent.

HANNEMAN

may be considered as the author of an academical dissertation, "*Ostrea Holsatica exhibens*," of which Hans Roslin was respondent, and which was illustrated by a plate. It is copied into Valentini's *Amphitheatrum Zootomicum*, hereafter to be mentioned.

REAUMUR,

whose name is immortalized among naturalists by the perseverance and profoundness with which he studied the structure and œconomy of the smaller animals, deserves to occupy a distinguished place in the catalogue of Testaceological writers. To this illustrious zoologist we are indebted for several admirable dissertations on the formation, growth, and motive powers of *Testacea*. The memoirs of the French academy from the year 1709 to 1717 derive from his labours a large share of their value; and to the details of his various curious discoveries contained in them recourse will be had with delight and advantage so long as the science of nature shall be loved. Each of his papers is illustrated by excellent plates, exhibiting several of the species described, and various parts of their internal structure; and each may be considered as the most complete, with respect to the subjects on which it treats, of any similar dissertations that had hitherto appeared.

The

The natural history of the *Pinnæ*, and the formation of Pearls, were elegantly and amply treated of in a memoir which appeared in the volume for 1717.

The "*Thesaurus Animalium*" of

RUYSCH

contains several figures of shells grouped with corals and other substances, as they stood in the museum; but, his book being a mere catalogue, the descriptions are of little use. The 6th plate, which is admirably engraved, exhibits the shell and contained animal of a species of *Voluta*, which he calls *Buccinum Guienense*. Most of the shells figured in this work are natives of the Indian seas.

The countryman and contempory of Reaumur, and whose only treatise relative to *Testacea* appears among the memoirs of the same learned body,

MERY,

wrote some remarks on the common river muscle, which are both elaborate and diffuse. The anatomical structure of the animal is considered; and we find other descriptions of a miscellaneous nature: but this author seems to have borrowed pretty largely from the labours of others.

MORTON,

the natural historian of Northamptonshire, notwithstanding the number and elegance of his engravings of fossil shells, and his mention of many species of the recent kind, unfortunately ha presented us with only two figures of the latter, which occur i his 13th plate: his description of them, however, is in genera illustrated by references to Lister.

 CYPRIANUS,

CYPRIANUS,

the editor of Franzius's "*Historia Animalium sacra*," made very considerable additions to that author's description of the *Testacea*; and though the name of Franzius himself does not seem to deserve a separate place in our catalogue, that of his continuator merits very respectful mention. His 8th chapter *De Testatis* embraces a variety of literary and physiological matter relative to those animals; some notice is taken of systems, and a variety of references are made to preceding writers; but the descriptions themselves are too general to be of any use in the investigation of species.

In 1714 were published the valuable plates illustrative of various subjects contained in the museum of

GOTTWALD,

of Dantzic. These were not accompanied by any description, though they have numbers referring to manuscript notes of the collector. The museum seems to have been particularly famous for the anatomical preparations it included. The plates are one hundred and nine in number, no fewer than forty-three of them exhibiting shells. They are executed with no less accuracy than beauty, and may be considered as peculiarly useful for reference. It is to be lamented, however, that few of the original copies of this work are complete; the one possessed by Sir Joseph Banks is the only perfect one we have seen. (See MULLER.)

BARRELIER,

the French botanist, whose work was edited in this year by the elder Jussieu, did not confine his industrious and scientific researches to plants alone, but was author also of a description of certain species of *Insecta* and *Vermes*, which is illustrated by plates, and comprehended in the volume of his labours. Three

of

of these plates contain shells, and are not ill executed, but the descriptive part is slight and useless.

JOHN HENRY LOCHNER,

the author of a work entitled "*Rariora Musei Besleriani*," unfortunately did not live to enjoy the reputation which, as he was only twenty years of age at the time of completing such laborious descriptions, was so justly due to him. The care of publishing them devolved to his father Michael Frederick Lochner, who was director of the Imperial Academy *Nat. Cur.*, and by whom we are presented, in the preface, with an interesting account of the extraordinary youth so prematurely snatched from the world, as also of the two Beslers, whose collections were so much celebrated in their day. Twenty-four plates out of the forty are the same as appeared in Basil Besler's own work, and there are only three relative to shells. Much of the description is extracted from other authors, and the knowledge displayed in it is chiefly of an antiquarian and philological nature, there being no attempt at system.

VALENTINI,

though his most voluminous work came forth as early as the year 1704, we have named here, on account of his most *valuable* performance not appearing until sixteen years after the former; we allude to the "*Amphitheatrum Zootomicum*." It is true that a large part of the contents of this volume consists of extracts from preceding and contemporary writers, and many of the plates are copied; but, considered with reference to shells, the *Amphitheatrum Zootomicum* has much better claims to attention than the *Museum Museorum*. In the latter the figures of shells are wretchedly executed. In fact, this bulky work relates to *materia medica* as much as to natural history, and the second edition actually bears

 the

the title of *Historia Simplicium.* The testaceological remarks are extremely superficial, and defective in originality.

RICHARD BRADLEY,

though not a professed testaceologist, has not altogether omitted this order of animals in his "*Philosophical Account of the Works of Nature;*" and his figures of the species, though few and scattered, are not unworthy of being referred to. This work in its day must have been considered as an interesting view of the œconomy of nature, being judiciously written, and illustrated by a considerable number of accurate engravings.

Hitherto system in testaceology had made but little progress. That of Buonanni was almost the only one which can be said to have been fully and philosophically exemplified, and its outline was more or less preserved in most succeeding attempts; but its defects and errors, as we have before remarked, were numerous. After having noticed a multitude of mere describers, we now come to an author who is not undeserving of the title of a scientific one, and whose system, so far as marine *Testacea* are concerned (and of these alone he treats), certainly glances at the great clue to simplicity, which was afterwards so successfully and admirably seized by the great reformer of natural history in general. The author alluded to is

LANGIUS.

He is the first whose generic characters are founded on commodious distinctions, the aperture of univalves, and the hinge of bivalves, being particularly considered. These distinctions, however, are not allowed their due importance throughout; for the *contour* of the shell is, in many instances, made the exclusive basis of the definition, and the adoption of this naturally led, as in

in other systems, to a most inconvenient and perplexed multiplication of *genera*. The parts, classes, and sections also are far from being well conceived, and embarrass, rather than assist, the investigation of the other divisions.

A philosophical account of the growth, generation, &c. of testaceous animals is prefixed to the classification, which consists of three parts; the first having two classes and seventeen *genera*, the second six classes and fifty *genera*, and the third three classes and forty-three *genera*. There are no trivial names, nor are there many original descriptions of species, most of the latter being borrowed from Buonanni, Lister, and Rumphius.

The same year

BRUCKMANN,

of Brunswick, published a dissertation on the *Venus Dione* and a *Cypræa*, and

FRANKENAU,

in the *Acta Acad. Nat. Cur.* on *Chiton punctatus*, under the absurd title of "*Calva Serpentis Americani Diademata.*" Each of these is illustrated by copper-plate figures.

VALENTYN.

Though his descriptions, in consequence of being clothed in the Dutch language, do not admit of very general use, yet he has conferred great benefit on Testaceology by his admirable plates, of which there are sixteen (finished in the highest style both of accuracy and elegance), consigned solely to figures of East Indian shells. These plates accompanied the publication of the "*Oud en Nieuw Oost-Indien*," but were re-published, with conchological descriptions only, in 1754.

Valentyn's work may be looked upon as a sort of continuation of Rumphius's. As, like the latter, he was some time resident in Amboyna,

Amboyna, his opportunities of investigating the natural productions of those shores were extensive. He was chaplain to the Dutch settlement in that island, and in his five parts of the History of the East Indies, he was at the pains of writing every thing he knew relative to the geography, civil history, zoology, &c. of a part of the world from which his countrymen had drawn such various riches.

SLOANE,

a name as familiar as it is dear to naturalists, has a place in our list correspondent to the date of the 2d volume of his *Voyage*, *viz*. 1725. The preface to this volume assigns the reasons for the long interval that occurred between the publication of it and the first, and these reasons are too much connected with our immediate subject not to deserve mention here. Sir Hans was principally occupied by the care, arrangement, and description of his museum, which in 1702 received the augmentation of Mr. Courtein's valuable stores, and in 1718 that of Petiver's.—In the collection of plates belonging to the 2d volume of the Voyage there are two (viz. 240 and 241) that contain figures of shells, with Latin descriptions over each species; some taken from Lister. Our illustrious author being the first person who visited Jamaica and others of the West India islands, purely with a view to the extension of science, his plates and descriptions, of course, relate to many species not before known.

KUNDMAN,

a great collector of natural curiosities, is placed by De Bergen among the systematical writers; but his "*Promptuarium*" has the arrangement rather of a catalogue than of a scientific treatise, and it seems to be founded upon Buonanni's rather than to be a system of his own. There is a paper of this collector in the *Act.*

Acad.

Acad. Nat. Cur. on monstrous shells, and species that fetched a high price at that period.

Among the *Observationes Rariorum Med. Anat. et Chirurg.* of

STALPART

is a dissertation entitled "*Conchæ falsis gravidæ Anseribus*," which forms another refutation of the absurd notions once entertained respecting the origin of the Barnacle Geese, and is illustrated by a plate copied from Wormius. The figure is quoted by Linnæus, though evidently not original.

JOHN ERNEST HEBENSTREIT

seems to have been the first writer who thought an arrangement of the *Testacea* worthy of forming the subject of an academical dissertation. The author makes no fewer than eight classes, six of which comprehend the univalves, and two the bivalves. Attending, like most of his predecessors, by far too much to the innumerable variations of the general shape of shells, and by far too little to the apertures and hinges, he has multiplied the subdivisions of his system to a very unnecessary degree. He has also introduced an useless, if not an unphilosophical, distinction between *Testacea* and *Conchylia*.

The museum of Richter, a senator of Leipsic, was described by this author; but the method which he observed in that undertaking seems to have been compounded of Aristotle's, Lister's, and Rumphius's, conjoined with his own.

DALE

(the well known author of the *Pharmacologia*) has inserted in his edition of Taylor's *History of Harwich* an account of the *Testacea* found in the country and on the sea-coast about that town. This account

account is arranged agreeably to the system, and for the most part in the words, of Lister, but not without synonyms of preceding authors and many remarks of his own. As the figures of the Harwich fossils are so numerous and so accurate, it is much to be lamented that the recent shells were not included among the engravings.

BREYNIUS

was another author who formed a systematic arrangement of shells. His "*Dissertatio Physica de Polythalamiis*" derives its principal merit from the more precise specification of the *Belemnitæ*, *Ammonitæ*, and *Orthoceratitæ* than had hitherto appeared. There are seven good plates of *Echini* accompanying this work. Breynius was author also of a Latin epistle to Sir Hans Sloane on the plants and animals of Spain, which appears in the *Philosophical Transactions*, and which contains a description (with figures) of *Helix Janthina*, mentioned by this author as "*Cochlea colore speciosior.*" There is another epistle, (viz. "*De quibusdam Conchis minus notis,*") in the *Mem. sopra la Fisica e Istoria Naturale.*

VALLISNERI,

the celebrated Italian physiologist, whose pursuits were so similar to those of Reaumur, did not, any more than the latter, disdain paying attention to testaceous animals. In his *Opere Physico-mediche* we find two dissertations; one relative to the *Teredo navalis*, and another on the subject of some *Chitons*. The *Teredo navalis* gave rise to numerous essays about this time, more especially in Holland and Germany. The former of these countries had peculiar reason to feel an interest in the history of that destructive creature. In the year 1730, the persons appointed to take care of the dykes observed that the piles (which were made of the hardest oak) defending the low countries from the incur-

sions

sions of the sea, were eaten through in a few months. The damage occasioned by so extraordinary a corrosion of the timber was immense, and the people of Holland were thrown into the utmost consternation. Luckily, however, adequate remedies were ultimately discovered; and it was by the accounts which came from the pens of Rousset, Putoneus, Belkmeer, Massuet, but more particularly

SELLIUS,

that naturalists now had an opportunity of learning very fully the history of the *Teredo*. The work of Sellius is entitled "*Historia Naturalis Teredinis, seu Xylophagi Marini.*" It is illustrated by two plates, and contains much learning, as well as curious detail of facts relative to the structure and habits of the animal.

The following year

FISCHER,

of Konisberg, published a synoptical table of shells, which is contained in the work of Klein on *Echini*. It is divided into three parts, *Cochleæ*, *Conchæ*, and *Polyconchæ*, each of these being subdivided into classes and *genera*. The names of most of the latter have been retained by Linnæus to designate his species; but, in fact, they have been in pretty general use from the time of Rumphius.

The 2d edition of the *Bibliothecæ Appendix* of

BYTEMEISTER

contains two plates of shells (viz. 11. and 12.), which are executed with great accuracy. It is to be lamented that they are not accompanied by some description.

In a work published by

DESLANDES

are two dissertations; one on the subject of Barnacles, and the other "*sur les Vers qui rongent le Bois des Vaisseaux.*" From the na-

ture of the facts of which they treat, it cannot be supposed that they contain much original matter, those species of *Testacea* having been amply described before.

The "*Catalogue raisonné*" published by a dealer at Paris of the name of

GERSAINT

would scarcely deserve mention here, were it not prefaced by some general observations on shells, an account of the principal cabinets then existing in France and Holland, and a list of such authors and their works as are most worthy of being consulted: these particulars are interesting to collectors, and render the book useful for reference; though it is very defective in the enumeration of testaceological writers, and is more suited to the lover of mere curiosities than to the man of science.

DUHAMEL,

the well-known French botanist, ought to be mentioned among our authors, having published some experiments on the colouring matter furnished by the *Purpura*, with remarks on the species itself. These are inserted in the *Mem. de l'Acad. Royale des Sciences* for 1736. Duhamel considers the purple fish of the antients as a species of *Murex*; whereas his countryman Reaumur supposed it to be the *Buccinum Lapillus* of Linnæus.

It will be proper to place here

SWAMMERDAM;

since it was in 1737 that his *Biblia Naturæ* first appeared, a work containing many valuable anatomical remarks on testaceous as well as other animals, which are illustrated by figures. From the catalogue of this great physiologist's museum, published in 1679, it appears that he was an indefatigable collector of most kinds

kinds of natural curiosities, shells forming no inconsiderable part of the cabinet. Though the works now alluded to came forth in Dutch and Latin, yet the *Biblia Naturæ* soon assumed an English dress; and its latest edition by Hill, containing the translation made by Floyd and notes copied from Reaumur, was a very acceptable addition to the libraries of our countrymen.

PLANCUS,

of Arimini, published a curious book on shells found on the shores of the Adriatic, with an account of the tides in that sea: there are descriptions in it also of several marine productions besides *Testacea*, which, with the latter, are figured in five plates. Some of the species so nearly resemble the *Cornua Ammonis*, both internally and externally, that the author might almost have been warranted in asserting the existence of recent specimens of those remarkable shells, so frequent in the fossilized state. The first edition of Plancus's work, "*de Conchis minus notis,*" was printed at Venice in 1739; the second at Rome in 1760, with nineteen more plates than appeared in the former, which contained only five; and in these five some additional figures are inserted.

In the year 1742 appeared the splendid and valuable work of

GUALTIERI,

entitled "*Index Testarum Conchyliorum quæ adservantur in Musæo Nicolai Gualtieri, Philosophi et Medici Florentini,*" &c. The author, in his preface, gives some account of the books that had been published before his time; he also exhibits a system composed by TOURNEFORT, whose manuscripts on this subject had been presented to Gualtieri by Professor Targioni. The curious reader cannot fail to be interested in whatever came from the pen of one

of the greatest naturalists the world has known, and will find that this composition (which had not before made its appearance in print) deserves to have had a place among the most important of his works. Besides the great number of new and expressive terms which were introduced into Testaceology, the *genera* constructed by Tournefort exhibit infinitely more science and precision than those of any preceding writer in the same branch. His classes are analogous to those which had begun to be in general use, namely, *Univalvia*, *Bivalvia*, and *Multivalvia*; but this author preferred the terms *Monotoma*, *Ditoma*, and *Polytoma*. The classes are divided into *familiæ*, the characters of which are drawn chiefly from the general habit and contour; whereas those of the *genera* are founded in a great measure on the mouth or hinge, according as the shell is simple or valved. Besides Tournefort's system, our author gives a specimen of that of Breynius; but he adheres to Langius's, with the exception of the class *Polytoma*, borrowed from the first-mentioned writer. In the 110 plates which accompany Gualtieri's work are given figures of the most rare shells of the Asiatic and African shores; several of which were very indifferently engraved by Buonanni and other authors, and many (especially of the *Coni*, *Helices*, and *Neritæ*,) do not appear to have been engraved before. It must be remarked, however, that many of the subjects from which the drawings were made appear to have suffered from the polish of the dealer, and the outline is not always given with scrupulous fidelity: yet, upon the whole, the *Index Testarum* of Gualtieri is an useful and magnificent work, and deserves a place among those which are most worthy of being consulted and referred to. As this did honour to Italy, so, in the same year, did that of

D'ARGENVILLE

to the kingdom of France. The modesty of this author induced him to conceal his name in the first edition, the title page intimating only that he was of the Royal Academy of Sciences at Montpellier: it was inscribed "*L'Histoire Naturelle éclaircie dans deux de ses Parties principales, la Lithologie et la Conchyliologie*," &c. In the first chapter of the first part some account is given of natural history in general, and of the works of those writers who have treated of Lithology and Testaceology. The catalogue is short, and the author declines speaking of his contemporaries, and of such as have given the natural history of particular countries only. In the second chapter of the second part he proceeds to develop his system, dividing *Testacea* into the three commonly received classes, and separating those species which inhabit the sea from those which inhabit the land. His families are twenty-seven in number, including the *Echini*, and are founded chiefly on external figure, though in the *genera* of *Pholas*, *Solen*, *Chama*, *Venus*, *Ostrea*, *Cypræa*, *Conus*, *Nautilus*, *Strombus*, *Trochus*, *Helix*, *Nerita*, *Dentalium*, *Haliotis*, and *Patella*, the characters correspond very nearly with those established afterwards by Linnæus. Of thirty-three plates, twenty-six exhibit many of the more common as well as of the more beautiful shells; they are not only finely but accurately executed, and entitle our author to the epithet of "*nitidissimus*," so appropriately bestowed on him by the great Swedish naturalist. We ought not to omit mentioning that, besides a particular description of every species, the work contains a chapter on the formation and growth of *Testacea*, some observations on the methods of cleaning and polishing shells, and a concise account of the most celebrated cabinets of natural curiosities existing in Europe at that time.

The

The second edition of D'Argenville was augmented by a history of the *Mollusca* inhabitants of shells, and three new plates, two of which are illustrative of those animals; and the latter are figured, in general, of their natural size.

In 1780 there was another publication of this admirable work, with considerable additions, corrections, and improvements, by Messrs. Favanne de Montcervelle (father and son). There are upwards of 2000 shells figured in this edition, and in so masterly a manner that the work, on the whole, surpasses every thing of the kind which the world had seen before, and must still be held in the highest estimation by the lovers of testaceology.

BARTRAM

appears in the *Philosophical Transactions* as author of some "Observations concerning the Salt-marsh Muscle, the Oyster-banks, and the Fresh-water Muscle of Pennsylvania." These observations are accompanied by figures.

NEEDHAM,

whose account of *Microscopical Discoveries* is well known in our own country, deserves mention here, as having given a very full description of the *Lepas anatifera*, with figures of that shell and of various parts of the contained animal, which are referred to by Linnæus.

At this period the "*Testaceo-Theologia*" of

LESSERS

was written, with a view to elevate the study of those beautiful and varied creatures that inhabit the depths of the ocean to a level with others more commonly chosen for demonstrating the power and wisdom of the divine Ruler of the universe; and surely

surely there are few tribes of animals which, by delighting the eye and engaging the attention, seem more likely to dispose the mind to sublime meditations, and to form a never-failing source of wonder and admiration, than the testaceous inhabitants of the deep. The title of this work might give rise to the supposition that it is calculated solely for popular use, and that the information is of that general and discursive kind which becomes subservient only to the exercises of piety; but it will be found to be no less suited to the study of the man of science. It contains a more full account of testaceological writers than occurs in most other treatises of this nature; it abounds with anatomical and physiological knowledge; the descriptions are conformable to a scientific arrangement of species; and by the notes and synonyms the author discovers himself to have been conversant with all the best productions of his predecessors in this department of natural history. It is also embellished with 137 figures of shells, which, though somewhat roughly engraved, are not unworthy of being consulted. A second edition was printed in 1756, preserving the octavo form like the first; it is only to be lamented that it did not undergo conversion from the German into some more current language.

At this period the natural history of our sister kingdom began to be investigated by men well qualified to do full justice to the subject. The first of these who committed his researches to the press was

DR. CHARLES SMITH:

but this gentleman limited them to the counties of Waterford, Cork, and Kerry, which counties he described successively, and in separate works, under the patronage and with the assistance of the Physico-Historical Society of Dublin. It may not be superfluous to remark, that the express purpose of this institution

was to cultivate the natural history of Ireland, and that it owed its origin probably to the plan originally formed by Mr. Boyle in England, which led to the labours of Plot and other county historians, and which cannot be sufficiently applauded for its utility. On the subject of *Testacea* Dr. Smith was not very minute or methodical: but the more common and well known species he is far from having, in all instances, treated of superficially.

DR. JAMES PARSONS

described two species of *Testacea* in the *Philosophical Transactions*: but they form the subjects of separate communications, the first of which, relating to *Mytilus lithophagus*, occurs in vol. 45, and the second an account of *Pholas pusilla*, called by this writer *P. conoides*, in vol. 55. The latter is illustrated by four figures.

The "*History of Animals*" of Doctor (afterwards

SIR) JOHN HILL

contains five good and correct plates of *Testacea*, each figure having its English name underneath. This author divided shells into a certain number of "*series*," the characters of which are founded on very dissimilar principles, some of them being derived from the nature of the shells themselves, and others from their habitations, like the divisions adopted by Lister. The *genera*, however, have some resemblance to those of the Linnæan system. The specific descriptions are in Latin, but the other parts of the work in English.

In the *Recueil de l'Académie de Rochelle* is a full description by

MERCIER DU PATY

of *Mytilus edulis*, to which the author has annexed three plates.

KLEIN.

The first work published by this author which it falls within our province to notice is his "*Descriptiones Tubulorum Marinorum*," containing nine plates, which represent chiefly different species of *Belemnitæ*; but he notices also various species of recent *Testacea*, as *Solenes*, *Dentalia*, &c. in order to complete his arrangement of the tubular coverings of animals. But the principal testaceological performance of this author was his "*Tentamen Methodi Ostracologicæ*," a work (as its title implies) written professedly with views to the establishment of a system, but which, though the composition of a very able naturalist, certainly does not possess the merit of practical utility. The general divisions (forming *parts*, *sections*, *classes*, and *genera*) are too numerous, and, what is worse, species are constituted in some instances without being referable to any genus; and in one of the *parts* there is a solitary genus without any class. The specific descriptions, however, are for the most part sufficiently full and precise, and there are frequent references to Aldrovandus, Gesner, Buonanni, Lister, and Rumphius. The work contains twelve plates; the figures are one hundred in number, but exhibit a harshness which is not compensated by any extraordinany correctness, and most of them are copies. A subjoined dissertation, "*De Formatione, Cremento et Coloribus Testarum*," deserves to be considered as the best part of the volume, for it contains many physiological remarks of an original and curious nature. This subject, though taken up by so early an author as Buonanni, had not hitherto been entered into so much as the nature of it demanded.—Klein wrote also on the *Lepas anatifera*, in the Memoirs of the Nat. Hist. Society of Dantzic.

JO. HENR. COHAUSEN

was the author of a "*Conspectus Sciographicus Testaceorum.*" There cannot, however, be a more strange and unscientific arrangement of shells than the one here proposed; nor can it answer the purpose of any person to whom the descriptions of Pliny, Buonanni, and Rumphius are familiar, to consult it.

A considerable work on shells was published in the year 1755. The author,

NICHOLAS GEVE,

does not give any scientific names, nor is his description of much use to a scientific reader; though there are some good references in the notes. He employs both the German and the French languages, and is very diffuse. The plates are the most valuable part of the work, being thirty-three in number, and containing 434 coloured figures, which are in general correct.

DR. WHYTT

was author of a description of the ovary of the *Buccinum ampullatum.* This description is accompanied by figures.

Two memoirs on the subject of *Testacea* were laid before the French Academy by

GUETTARD,

well known by various other interesting tracts on different branches of natural history. The first of these memoirs is entitled "*Observations qui peuvent servir à former quelques Caractères de Coquillages.*" Fourteen *genera* are here described, founded on the nature of the contained animals. The second memoir is "*sur le Rapport qu'il y a entre les Coraux et les Tuyaux Marins, et entre ceux-ci et les Coquilles.*" To this are annexed five excellent plates

of

of *Serpulæ*, *Dentalia*, &c. In the general collection of his works we find a description of the *Sable coquillier*, or shelly sand found at Zalbach, near Calais (tom. 2. p. 21—22.); also a long dissertation on tubular substances found in the sea, which is accompanied by a scheme of arrangement.—The last of this author's memoirs which it falls within our province to mention is on the subject of *Lepas anatifera*. The history of this animal is very diffusely given in the 4th volume of the collection. M. Guettard remarks upon the accounts given by authors from the earliest times, tracing out the origin of the fabulous narratives that were copied from one to another respecting that singular species.

In the Transactions of the Electoral Academy of Mentz, the only writer who has treated of shells is

JOHN FREDERIC HOFFMAN.

Two of his communications relate to species resembling the *Cornu Ammonis*, which, in fact, he describes as being found in a native state; but, though a *Nautilus*, the shell he alludes to cannot properly be considered as being the same with that fossil. The "*Tubuli vermiculares Cornua Ammonis referentes*" (described in p. 16—20.) are minute shells, similar, many of them, to what had been before noticed by Plancus. The 2d volume of these Transactions contains a paper from the same author descriptive of *Helix auricularia*, the animal of which species, as well as the shell, is minutely noticed.

COUNT JOSEPH GINANNI,

of Ravenna, rendered himself well known to the lovers of Testaceology by two considerable works which treat of that subject very largely. The *Opere Postume* contains a description of the maritime, marsh, and terrestrial *Testacea* of the territory of Ravenna,

 after

after a system somewhat similar to Buonanni's, and in the Italian language. These different tribes are distributed into three correspondent treatises, the first of which is accompanied by thirty-one plates, the second by four, and the third by three only. The engraving is slight; but there is a correctness of design in most of the figures, and several new species are contained among them. A like character may be given of those which accompany the other work, descriptive of the museum formed by his uncle Count Francis Ginanni, for which he had prepared most of the materials, though its publication did not take place until five years after the former. It is illustrated by two plates of *Testacea*, which, under the head of "*Corpi che stanno in Mari,*" are described agreeably to the system contained in the *Opere Postume*. There are pretty numerous references to preceding writers, which considerably assist readers unacquainted with the Italian language.

In the same year with the re-publication of the fine work of D'Argenville, the French had to boast of another author of their nation rendering singular service to the study of the *Testacea*; this was

ADANSON,

who, in his "*Histoire Naturelle du Senegal,*" has presented us with an accurate description of shells figured in sixteen plates. It is prefaced by an account of the author's travels in the years 1749, 1750, 1751, 1752, and 1753. There is also a general history of Testaceology, and an arrangement of species invented by himself. This arrangement rests principally on circumstances connected with the structure and habits of the animals; on which subject Adanson is more diffuse and particular than almost any person who preceded him. His general divisions of *Testacea* are *Limaçons* and *Conques*; the first of these comprehending his *Univalves* and *Operculées*, the second *Bivalves* and *Multivalves*. His species are only 185

in

in number; but under each of these are arranged numerous *varieties* (as they are considered by this author), which, however, have most of them been constituted distinct *species* in other Testaceological works. These are illustrated by 400 figures, which have in general the merit of correctness, but are not so elaborately and strongly engraved as might be expected in a French performance of that period, when, in this highly useful and elegant art, France was not rivalled by any other nation in the world.

There is a paper by this author in the *Mem. de l'Acad.* descriptive of a species of *Pholas* which he observed in the timber of ships in Senegal, and illustrated by very good figures of *Teredo navalis* and the *Pholades*.

In 1758 appeared the long expected third volume of the "*Descriptio Thesauri Rerum Naturalium*" of

SEBA,

containing sixty-one plates of shells, some of which, however, may be considered as useless, since they represent figures of birds, &c. formed from those shells; and most of them discover great waste of engraving. There is still another subject of regret which must occur to every person who peruses this sumptuous and bulky work, namely, that most of the figures are common and well known species, and calculated more for the amusement of the eye, and for the surprise of the ignorant, than for the assistance of a scientific naturalist. The descriptive part is not remarkable for precision, nor is there any appearance of regular system. One very useful purpose, however, may be said to have been answered by the repeated representations of the same species given by Seba, which is the possibility of seeing it in various positions: the student being thus enabled to determine the agreement of his specimen with those which are figured, more certainly

tainly than when he is presented with only one view of a shell. This advantage seems to have been particularly attended to by Gualtieri, who may be considered as having given excellent hints to ichniographists; for his figures are no where unnecessarily multiplied (which is more than can be said in praise of Seba), and they have an obvious connexion with the more satisfactory determination of species. It is much to be lamented that in many other works, which (except in this particular) are of high value, his judicious example has been wholly overlooked.

BORLASE,

the indefatigable historian of *Cornwall*, is to be applauded for giving a pretty copious catalogue of the shells found in that county, which, from the position and extent of the shores, are very numerous. His 28th plate contains nearly thirty figures of *Testacea*, and they are very correct. The author displays but little science in this branch of natural history, and his descriptions are copied from some of the oldest writers on the subject.

There are some good figures, accompanied by descriptions, of several species of *Lepas*, in the *Philosophical Transactions*. The author of this description was

JOHN ELLIS,

well known by his elaborate work on *Corallines*; he addresses it in a letter to Mr. Isaac Romilly.

The figures of shells in

EDWARDS

are referred to in the *Systema Naturæ*; but they are very few in number, and occupy only a secondary place in this author's "*Gleanings*."

We

We now come to the proper place for adverting to what was effected in the science of Testaceology by the immortal

LINNÆUS.

From *his* great and comprehensive genius, this, like the other branches of natural history, was destined to receive an entirely new aspect: under his reforming hand it passed from confusion and incongruity to lucid order and simplicity; and though the improvement, as happens with all the most useful results of human labour, was, even under his pen, progressive, it reached a precision and facility of application to which former systems can scarcely be said to have approached.

There has been a very general belief that less attention was devoted by Linnæus to the history and arrangement of the *Testacea* than to any other order of the animal kingdom, and that he even thought their external coverings, or shells, scarcely worthy of becoming subjects of scientific distribution. Whatever may have been the origin of this belief, it certainly does not appear to us to be warranted by any examination of the *Systema Naturæ* itself, not even of its earliest editions. The original state of that extraordinary work (and it was in this that Linnæus first touched on Testaceology) did not indicate, perhaps, less happy reformation of method with regard to the *Testacea* than to other parts of organized nature; its deficiencies were those from which few other portions of the performance were exempt, and which were naturally to be expected in all, on the first sketch of so grand and so heterogeneous a subject. The great aim of the author being simplicity, he seems to have at first over-reached it rather than to have fallen short, and the consequences are obvious. His original *genera* of shells were too few, being only eight in number, viz.

1. *Cochlea.*

1. *Cochlea.*	5. *Patella.*
2. *Nautilus.*	6. *Dentalium.*
3. *Cypræa.*	7. *Concha.*
4. *Haliotis.*	8. *Lepas.*

In some of the subsequent editions of the *Systema* two or three more *genera* were added; but, at length, in the 10th they were augmented to thirty-two, which are only three less than Linnæus employed on any occasion afterwards. The edition of 1758 is, therefore, to be considered as the period at which he may be said to have perfected his principles of Testaceological arrangement, though, in fact, the principles themselves underwent no material change from the beginning, (a proof that our illustrious author never treated the subject with carelessness,) the only alteration that he deemed necessary being in the number of the *genera*: he accordingly broke that of *Cochlea* into *Conus*, *Bulla*, *Voluta*, *Buccinum*, *Strombus*, *Murex*, *Trochus*, *Turbo*, *Helix*, and *Nerita*, and that of *Concha* into *Chiton*, *Pholas*, and the *bivalvia*. The faults of the Testaceological systems which preceded Linnæus's may be readily deduced from the remarks made in various parts of this paper. These systems laboured under extreme difficulty of application, not only on account of the multitude of divisions and subdivisions which were deemed necessary by their respective authors, but also of the practice of founding generic distinctions on variations of general *contour*. Such variations being endless, there was consequently no end to the multiplication of families, and *species* became correspondently sparing. There was only one author who can be said to be free from reproach on this score, and that was Adanson: he, however, set out upon principles of arrangement essentially different from those of the generality of writers on this science, and, by making the contained animal almost exclusively the basis of his system, necessarily became limited

limited in the choice of generic characters. But to the establishment of characters purely zoological the objections are still stronger than to the being guided by the general form of the shell. Independently of the very small extent to which our knowledge of the *Mollusca* has hitherto been carried, it appears to us that, from the very nature of these animals when provided with a portable place of retreat from danger, they can never present those permanent and obvious points of distinction so indispensable to an apt and commodious investigation of all natural objects. Wherein does the animal differ from an unshapen mass of lifeless matter when coiled up within its shelly habitation? And how are its natural shape and appendages to be examined, but by the knife of an anatomist? In fact, it is reasonable to conclude that innumerable testaceous animals must ever remain unknown to us, except by the *exuviæ* accidentally thrown upon the shores after their death: many of them appear to inhabit inaccessible recesses of the ocean, and others part with life on the point of being removed from their native element. To place his system beyond the reach of those objections which presented themselves to all that had been hitherto proposed, Linnæus was obliged to strike out some principles of discrimination wholly different from any before exemplified; and that sagacity with which he seized new and admirable guidances to methodical arrangement, in other parts of the dominions of nature, fortunately assisted him also in this. After having convinced himself of the futility of forming a system of Testaceology solely on the structure of the animal, or even making the latter at all concerned in the *specific* distinctions, he astonishingly simplified the whole science by dividing *Testacea* only into the three obvious families of Univalves, Bivalves, and Multivalves, with subordinate *genera* characterized by variations of particular *parts* of the shells. The hinge in bi-

 valves,

valves, and the aperture, or mouth, of univalves, as it was a permanent character, so was it also less multiform than any other that could have been chosen. The general outline, however, was not wholly neglected. It served to form an uniting character for such as may be called natural families of shells, which were distributed into suitable divisions, subordinately to the artificial *genus*, so as to become an assistance instead of an embarrassment in the investigation of species. Thus, the terms *truncati*, *pyriformes*, *elongati*, and *laxi*, became useful demarcations in the genus *Conus*, without creating the confusion which must always be incident to too great a number of regular *genera*, especially when those *genera* are formed (as was the practice of the generality of preceding authors) from external figure only. In a few *genera* it was necessary to deviate a little from these principles, (and what system can be free from anomalies?) yet they are too few to affect the general simplicity, and we ought to be surprised only at the characters holding good so far as they do. But our great author was not wholly inattentive to the creatures for which the beautiful and endlessly diversified receptacles that he had characterized were designed. Among the generic marks was included the name of the molluscous inhabitant; or, where the animal differed from any which had a place in other parts of his system, he described it at length. Thus was a method established, which, though not speculatively regular, possesses so much practical utility that we cannot hesitate to prefer it to any hitherto made known to the world. Whatever improvements it may undergo (and of improvements all human systems must necessarily be susceptible), there is in our minds no doubt that the general foundations will stand the test of scientific application for ages; a sentiment which will appear the less bold, if we quote in aid of our assertions those of a very distinguished naturalist of a neighbouring

bouring country; in which if, after almost unprecedented pains had been taken, both by himself and by an indefatigable contemporary, for the formation of a perfect system, the principles of Linnæus remain unimpaired, we may fairly relinquish the expectation of being presented with any less exceptionable. "On peut dire," says M. Lamarck, "que Linné a établi les vrais principes qu'on doit suivre dans l'etude et la détermination des coquilles, et qu'il a posé les bases de cette intéressante partie de nos connoissances." (*Mem. de la Soc. d'Hist. Nat. p.* 63.)

Having made these general remarks on the Testaceological part of Linnæus's *Systema*, we shall proceed to notice such other of his works as relate to this branch of natural history. The first of these in order of time (and certainly not the last in point of value) was the *Fauna Suecica*, originally published in 1746, and containing sixty species of *Testacea* admirably described, with their synonyms at full length. In the second edition, which came forth in 1761, the number of species discovered to be natives of Sweden was augmented to eighty-nine, and the *genera* exhibited the improvements adopted in the 10th edition of the *Systema.* But, prior to the appearance of the improved *Fauna Suecica*, the author had described the cabinets of the king of Sweden and count Tessin, the contents of which had, no doubt, furnished him with new hints towards perfecting his method in every branch of natural history. It is to be lamented, however, that neither the *Museum Tessinianum* nor the *Museum Adolphi Friderici Regis* contain descriptions or figures of more than three species of *Testacea*. They are works of much splendour, in point both of typography and engraving, but afford very little assistance to the helminthologist. In the description of another *Museum* (that of the queen of Sweden) Linnæus made ample amends for his brevity in that of the former; and her Swedish majesty's collection being

 particularly

particularly rich in insects and shells, he was enabled to afford abundant information to the lovers of both these orders of the animal kingdom. The *Museum Ludovicæ Ulricæ Reginæ* may be considered as the best of Linnæus's Testaceological works, and, as it is so frequently quoted in the *Systema*, becomes, though now very scarce in this country, of indispensable utility to the scientific student. It describes 434 species of shells, and the remarks subjoined to the definitions of each are admirable for their precision, minuteness, and regularity. This volume was published in 1764; but, though posterior in date to that of the 10th edition of the *Syst. Nat.*, it retains the old divisions of *Conchæ* and *Cochleæ*. The last of Linnæus's works, viz. the *Mantissa altera*, contains thirty-five species not described in any of the books already mentioned.—It ought to have been remarked in an earlier part of this account, that our great author's Travels contain descriptions of several species of *Testacea* at considerable length; but, from the language in which these were written, they are of little use to the English reader. The *Iter Westro-gothicum* contains one plate of shells, which, however, represents the univalves reversed, as if they were all heterostrophous.

In regard to the terms and peculiar descriptive manner adopted by Linnæus in this part of his labours, they are no less surprising for their happy expressiveness, appropriateness, and utility of application, than in other departments of the science of nature, to which he gave the same new aspect and stability of reformation. They constitute a language of his own,—a language so eminently subservient to the purposes for which it was calculated, that it would alone be sufficient to mark the superior genius of Linnæus. At the same time we cannot hesitate to confess, that a few of these terms, however strongly they may be warranted by the similitudes and analogies which they express, and which when so

pointed

pointed out are of great advantage to the language of science, are not altogether reconcilable with the delicacy proper to be observed in ordinary discourse; nor are they such, perhaps, as should be employed on any occasions, except those when their original signification is immediately implicated. Yet these terms may be exchanged for others without detriment to the Linnean phraseology in general; and though none probably more expressive can be adopted for the respective purposes, they may be abolished without any great disadvantage to those generic definitions into which they have been introduced.

Whilst alluding to the language and terms employed by Linnæus in his description of the *Testacea*, we ought to refer the reader to the *Fundamenta Testaceologiæ*, in which they are all scientifically explained, and which contains a complete illustration of the principles of arrangement adopted in this part of his works. Though it bears the name of MURRAY, who was respondent in this academical dissertation, the performance ought properly to be considered as the President's, who, as in all the other papers contained in the *Amœnitates Academicæ*, furnished the principal materials for them himself. The paper of which we are speaking contains three plates, explanatory of the generic characters, and of the parts of shells to which the several terms apply.

In concluding our remarks on the works of Linnæus, we ought to take some notice of the editor of his *Systema*, GMELIN, who has increased the number of the *Vermes Testacea* to 2334. If the whole of this number were founded on unimpeachable authorities, and if the writer had in other respects inspired confidence in his correctness, as well as in his knowledge of the subject, great indeed would have been the obligation of naturalists to this laborious publisher. Unfortunately, however, his errors are innumerable

rable in this part of the *Systema*, with which he seems to have been less conversant than with any other; and so little dependence is there on his references and synonyms, that the same figure is frequently found to be quoted for species most widely different from one another; and even the same species, in more than one instance, is described twice. A writer who should undertake to rectify these errors would perform a truly valuable service to Testaceology. Such an opportunity presented itself to a countryman of ours, who has recently put the *Syst. Nat.* into an English dress, and who has professed having availed himself of the improvements and additions of later naturalists; yet we cannot find that Dr. TURTON has done more than having trodden in the steps of Gmelin, not perceiving even the most glaring of his inadvertencies. It would be wholly useless and superfluous, therefore, to assign any place to the English editor of Linnæus's *Systema* but that of a mere translator.

The remark we have made relative to the comparatively small number of rare species figured by Seba is applicable also to the superb and costly work of

REGENFUS,

which, though it reflects honour on the artist and on the monarch by whom he was patronized, has conferred but little benefit on Testaceology as a science. It contains twelve beautifully coloured plates, in imperial folio, each plate compehending twelve shells. The descriptive part (which is in both French and Danish, and was the work of Professor Kratzenstein and Dr. Ascanius,) is preceded by a full list of authors, and by an account of the principal cabinets of shells at that time existing in Denmark. Fronting each plate is a good table of synonyms, which may be considered as one of the most useful parts of the work; but the species

cies to which they refer are in general of the most common kind. We cannot but lament that the hand of so admirable en engraver was not employed on subjects which more strongly needed the assistance of his art in order to be known; for those which are figured by Regenfus fall daily under the notice of the most humble collectors. Had this work been continued, however, it is probable that there would not have been so much ground for regret. Among the plates intended for a second volume (impressions of twelve of which are possessed by Sir Joseph Banks) the species figured are much more interesting than in the first; several of these are described by Dr. Martini (*Berlin. Sammlung* 6. *Band. p.* 667—669.); but it is to be feared that, as the original artist is now no more, the intention of editing them has been relinquished.

The "*Opuscula Subseciva*" of

BASTER

contain much anatomical and physiological matter of a very curious nature, relative to testaceous as well as to crustaceous and molluscous animals. They were continued from the year 1759 to 1765, forming six distinct books, each illustrated by very instructive and interesting engravings. The propagation and *ovaria* of shell fish in general; the *Ostreæ, Mytili, Pholades,* and *Tellinæ;* and several species of *Testacea* individually, are amply and satisfactorily treated of; in short, to those who are more studious to ascertain facts in the œconomy, structure, and habits of animals than to store their memories merely with the names of *genera* and *species,* the works of Baster may be recommended, as containing a fund of important and original information.

There is a translation of this author's dissertation on the *Teredo navalis* in the *Philosophical Transactions*, and it is accompanied by figures.

An

An excellent *Monographia* of the *Helix decollata* was published by

BRISSON,

whose observations are illustrated by thirteen figures, and they relate to the structure of the animal as well as to the shape of the shell.

DR. FORBES

gives, in the *Philosophical Transactions*, an account (which, however, is much too concise) of a *Patella* found at Bermuda. The figure, as it exhibits only the structure of the animal, makes but imperfect amends for the deficiency of description; and though a short addition is made to the latter by Dr. Morton, the species is far from being defined.

In 1760,

KNORR,

a painter of Nuremberg, began the publication of a work entitled "*Les Délices des Yeux et de l'Esprit.*" He did not live to complete it himself; but the task was carried on by his executors, who concluded it with a sixth part, published in 1773. This last part contains forty plates of shells; each of the five former was limited to thirty. There are, in the whole, 978 figures, very slightly engraved, but well drawn and most elegantly painted. No order is observed; and many subjects are repeated, on account of slight variations in the colour and contour. The last ten plates present white shells on a dark-coloured ground. With the second part a systematical table is given; but this is connected only with the plates preceding, and very nearly agrees with that adopted by Rumphius, of which, in the present improved state of science, the reader will be content to take only a transient notice. The descriptions of the plates relate chiefly to the figure and colour of the objects represented, containing but few remarks concerning

concerning their natural history. A Linnean table is subjoined by the editors; this is too inaccurate, however, to be of use to a scientific student.

But the above was not the only Testaceological work, materials for which were compiled by this industrious and able artist. His "*Deliciæ Naturæ selectæ*" contain seven finely coloured plates of shells, with copious descriptions in French and German, intended for popular use. This volume came forth under the direction of Muller and de la Blaquière, the original author having died prior to the time of its publication; but his name cannot fail to be remembered with respect by those who devote themselves to his favourite pursuit, from the reflection that the *useful* parts of these elegant performances originated entirely with himself.

In this place it will be proper to notice a compendious view of various systems of Testaceology written by

DE BERGEN,

and printed at Nuremberg in 1760. It exhibits the systems of twenty-four different authors, under the heads of "*Methodi universales*" and "*Methodi particulares,*" with concise strictures on each system separately. This work originally appeared in the *Nov. Act. Ac. Nat. Cur.*

The *Acta Helvetica* contain two Testaceological papers from the pen of

SCHLOTTERBECCIUS;

one entitled "*Observationes de Cochlea quadam ad Turbines referenda,*" and the other "*Observatio Physica de Cochleis quibusdam nec non de Turbinibus nonnullis,*" &c. The very titles indicate the desultoriness of these descriptions; and the figures accompanying them do not supply their imperfections, except indeed some which are illustrative of the paper last mentioned, and which relate

late chiefly to fresh-water and land species of the *genera Turbo* and *Helix*. It is impossible to discover what species of shell is the subject of the first paper.

In the same work, and in the same volume with Schlotterbeck's first paper, we find some account of the *Turbo Nautileus*, by

HOFER.

This account relates chiefly to the animal, considered separately from the shell, and is illustrated by figures.

The *Comment. Acad. Sc. Imp. Petrop.* contain three papers communicated by

KOELREUTER,

who, in the first of these, has described a species of *Serpula* (found in the White Sea), which he calls *tubipora*, but which is the *filograna* of other writers. The second paper describes *Sabella scabra*, called by this author a *Dentalium*. *Sabella scabra* may be considered as a giant among the *Testacea*, the specimen described by Koelreuter being 4 feet 2 Paris inches long, and 3 lines in diameter at one end, and 6 at the other. There is a figure accompanying the description in tom. 12. Our author's third paper is of a physiological nature, and relates to the *ovaria* of *Mytilus cygneus*.

The 1st and 2d volumes of the *Amusement Microscopique* of

LEDERMULLER

contain some good coloured figures of minute shells; of which it is only to be lamented that the author has not given a more scientific description.

The anatomy and physiology of the *Vermes* were, at this period, subjects of more general interest than ever. The progress of

discovery

discovery had augmented the number of known species to a wonderful degree; and from remarking the large portion of the chain of organized life occupied by these creatures, naturalists were necessarily led to turn their attention to facts as well as to names, and to presume that many curious and important analogies, illustrative of the phænomena of life and sensation, might be collected from an examination of the structure and habits of so extensively varied a tribe. In the *Mem. de l'Acad. des Sciences* (a work which we have so frequently had occasion to mention with respect, as a repository of information highly valuable to the Testaceologist) we find a paper entitled "*Eclaircissemens sur l'Organization jusqu'ici inconnue d'une Quantité considérable de Productions Animales, principalement de Coquilles des Animaux,*" by

HERISSANT,

who has subjoined to it eight excellent plates, three of which relate entirely to shells, and the other five to *Madreporæ*, &c. The matter is not wholly original; but, when we mention that it occupies upwards of thirty pages, it will naturally be imagined that the reader may derive advantage from its perusal: there are certainly many facts and speculations which have not less merit for their novelty than for the utility of their application.

The extensive collection of natural curiosities formed by

M. DAVILA

is described in three octavo volumes. The first of these relates to the Testaceological part of the collection, which is treated of pretty conformably to the Linnean system, but wholly in French, and divided into three distinct portions, viz. "*Coquilles de Mer, d'Eau douce, et terrestres.*" There are twenty-two excellent plates, containing several species never before figured, and in a great

measure compensating for imperfections in the descriptive part. It is a work that deserves to be more generally known than it seems hitherto to have been in this country; and as the figures are both original and accurate, they ought to be more commonly quoted.

Among the *Mem. Etrang. de l'Acad. des Sciences* we find an excellent account of *Mytilus lithophagus*, written by

FOUGEROUX.

This account is illustrated by a beautiful plate, which exhibits very accurately the *nidus*, shell, and structure of the animal.

The 9th volume of this same work contains a memoir by

DE LA FAILLE,

"*sur l'Origine des Macreuses*," in which a full refutation is given of the strange story of the Barnacle Goose, and there is a large figure of the well-known shell originally supposed to produce it. This was a subject on which it was scarcely worth while for a writer of so late a period to employ any pains.

GEOFFROY

merits mention among writers on the *Testacea* for his "*Traité sommaire des Coquilles tant fluviatiles que terrestres qui se trouvent aux Environs de Paris.*" The number of species described is forty-six, which are included in seven *genera*; and the system is the author's own, though not materially different from that of Linnæus, except that more attention is paid to the animal itself than in the works of the latter. The specific descriptions are given in Latin, but the bulk of the work is in the French language. An artist of the name of DUCHESNE published three plates of Fresh-water and Land Shells, which form a good accompaniment to these descriptions

descriptions of Geoffroy; they contain figures of forty-six shells (with French names correspondent to Geoffroy's system), all found in the environs of Paris.

Many valuable experiments and observations, tending to throw light on the physiology and pathology of the Snail tribe, are to be found in the *Journal des Sçavans* for 1770. They were commenced in the year 1768 by

COTTE,

and continued in the *Journal de Physique*.

WALLIS,

the historian of *Northumberland*, includes the *Testacea* in his account of the natural productions of that county, adding copious synonyms from Lister, Petiver, and Linnæus; but the number of species described is only eight.

The commencement of the great conchological work of

MARTINI,

in the year 1769, may be considered as forming a sort of epoch in the history of that science, it being the most copious, laborious, and valuable publication on the subject of shells that has hitherto appeared. Only three volumes, however, were completed by this author; the other seven came from a Danish clergyman,

J. H. CHEMNITZ,

by whom the undertaking was concluded in 1788. The "*Neues Systematisches Conchylien Cabinet*" contains 366 plates, exhibiting no fewer than 3711 figures, besides vignettes, &c. which are all faithfully drawn, and coloured with the utmost accuracy. In the 9th volume are many South Sea species, which had never before been figured, and which were selected from some of the most celebrated

celebrated cabinets on the continent, but more especially from that of Spengler, whose collection deserves to be considered as one of the most extensive, as well as the most replete with rare and interesting specimens, that has ever been formed for the study of the *Testacea*. The name of SPENGLER ought to have a place also among the writers on these subjects, descriptions of several shells from his pen having appeared in different German publications; and it has not unmeritedly been attached, as a specific denomination, to a *Mactra* described by Chemnitz.

The work of which we are here particularly treating does not materially differ, as to system, from the Linnean school, but (excepting just the definitions of the species and the synonyms) is written wholly in the German language; and it is much to be lamented that it has not assumed any other dress, for the fulness of the descriptive part renders it highly worthy of being consulted. At the period when the use of the Latin language was thought indispensable in books of science, the attainment of knowledge was attended with much fewer difficulties than at present, when, though the use of a dead language may not be absolutely necessary, there is certainly as much need as ever of some one tongue being made the medium of communication among philosophical men of all nations. We do not hesitate to pronounce the volumes of Martini and Chemnitz as constituting a Testaceological library in themselves; and we cannot, therefore, adequately express our regret at their utility as books of reference being limited to the German scholar, when it might, without any considerable difficulty, have been extended to all lovers of the science by the substitution of French.

Chemnitz was author of several Testaceological papers inserted in different foreign journals, but they are not of sufficient importance to require being particularized. His collection of shells is

is proved to have been very rich, by the catalogue of the sale lately published: of the number of the multivalves contained in it, we may judge from his remarks on that division published in the *Nova Act. Acad. Nat. Cur.* wherein he speaks of being possessed of no fewer than thirty different species of *Chiton.*

SCHRÖTER

may be considered as one of the most indefatigable Testaceologists of later times. His treatises on land and river shells, and his introduction to the Linnean system of conchology, have laid his countrymen under great obligations to him, and have contributed in a very conspicuous degree to the general extension of the science. We shall proceed to specify the titles and time of publication of these highly useful works; after which we would, with a due tribute of praise to the author, detail such of his labours as are of less account, were they not too numerous to be noticed in a paper of this kind, and were not most of them scattered in a variety of German publications, to which recourse cannot very generally be had in this country. The "*Versuch einer systematischen Abhandlung uber die Erdkonchylien um Thangelstadt*" is illustrated by two copper-plates, containing figures of the land shells found chiefly in the neighbourhood of Thangelstadt. The next work was an account of the river shells of Thuringia. This excellent treatise contains eleven very correct engravings, which, however, are rather too highly coloured. There are long descriptions in it, with good specific characters, formed on the Linnean method. A third treatise came forth at Frankfort in 1783, under the title of "*Ueber den innern Bau der See und einiger ausländischen Erd und Fluss Schnecken,*" with five plates. In the same year with the last-mentioned work this writer published his general conchology in three thick octavo volumes, illustrated

illustrated by nine good plates, and containing ample descriptions, with synonyms at length, of every known species of shell. The "*Einleitung in die Conchylienkenntniss nach Linné*" sets out with an explanation of the Linnean system of Testaceology, to which it forms an excellent introduction. The systematical part, however, inverts the order followed by Linnæus in his *Systema Naturæ*, as it begins with the Univalves and ends with the Multivalves.——Consistently with chronological detail, we ought to have mentioned in an earlier part of our notices of Schröter his republication of the plates of Gottwald's museum; yet this volume not being wholly original, though so acceptable a present to the lovers of Testaceology, might, without impropriety, perhaps, have been excluded from the regular enumeration of works more creditable to the author's reputation. Of forty-nine plates, forty-three relate entirely to shells which had been in a great degree described (though not in print) by the older Gottwald. The drawings also from which the figures were taken had been made by that collector. At the death of Dr. J. C. Gottwald the plates and MSS. fell into the hands of a bookseller, who (after they had undergone revision and received additions from the author of whom we have been treating) published them at Nuremberg in 1782. The museum itself was purchased by Peter the Great for 1000 rubles. We have before spoken of the correctness and elegance of the engravings, which cannot fail to immortalise the name of Gottwald; and his editor has imparted much additional value to the work by the subjoined letter-press.

RUTTY,

in his "Essay towards a Natural History of the County of Dublin," has followed pretty nearly the steps of his countryman Smith, referring to no scientific author on the subject of *Testacea*, excepting

cepting Lister, and his information is (on this subject at least) in no respect ample.

In the *Fundamenta Zoologica* of

BRUNNICH

we find a few *genera* added to those of Linnæus, but only among the univalves; the genus *Nautilus* being divided into three, and that of *Buccinum* into the same number. These alterations are strictly reconcilable with Linnean principles, yet it may be reasonably doubted how far they are *necessary*.

At the head of those writers who have contended for what may be called the *natural* system of Testaceology, or a system founded on the stucture and habits of the inhabitants of shells, may be placed

OTHO FREDERIC MÜLLER,

one of the most laborious and sagacious zoologists of his age. In his "*Vermium terrestrium et fluviatilium Historia*" we have a sketch of his proposed arrangement of the land and river *Testacea*, which, according to this author, form two very distinct orders, though not differing from each other so widely as the fresh-water and the maritime. The characters of his *genera* are taken chiefly from the shape of the *tentacula* of the animals; in the bivalves, from the *siphon* which they protrude. Hence the Linnean *genus Limax* is included in the testaceous instead of the molluscous order. The work in which these outlines are given is published in two volumes, the first begun in 1773, and the second in 1774: the latter relates solely to the subject of which we are treating; and its preliminary matter, in a physiological and anatomical point of view, is of a very curious and instructive nature.

In 1776 our author printed a *Prodromus* of the Zoology of Denmark, containing concise descriptions of every known species inhabiting

habiting that country, with the names by which they are therein vulgarly designated, as well as those which serve the purposes of system. The *Testacea* are arranged under thirty-six *genera*, of which ten are of our author's own construction, and derived from his peculiar method of arrangement; the others agree with the Linnean classification.

This work was followed a year afterwards by the first *fasciculus* of his "*Animalium Daniæ et Norvegiæ rariorum ac minus notorum Icones.*"

The *Zoologia Danica* was completed in 1779. It describes at considerable length all the new and most remarkable species; and, agreeably to the author's scheme of Testaceological arrangement, the contained animals are not less minutely noticed than their shells. The *Icones* were re-edited in 1781 in the same volume with a folio history of the species which they represent; forming, in fact, the Danish Zoology. We cannot conclude our account of Müller's labours on the subject of the *Testacea*, without expressing our admiration of the fidelity and perseverance with which he has added to our knowledge of that order of animals. No observer has hitherto done so much towards rendering us fully acquainted with their structure and œconomy; and though, as the basis of a system, his researches are not susceptible of so useful and general an application as the more artificial method of Linnæus, they cannot fail to be of permanent importance to the common stock of natural science.

FORTIS,

the Dalmatian traveller, has given a few good figures of *Testacea*, to illustrate the description of those species which he found in the *Porto di Bua*.

FORSKÅHL,

FORSKÅHL,

the celebrated traveller, also attended to this subject. In the description of the animals observed on his journey in the East, we find nearly thirty shells, though few of these were new. Among his *Icones* are figures of some of them and their contained animals, but they are very slightly executed.

There is a good figure of *Helix cornea*, with the animal, in the *Naturkundige Verlustigingen* (or Naturalist's Amusements) of

SLABBER,

who has given some remarks on this species.

We must not omit noticing the *Zoophylacium Gronovianum*, a description of the rich museum of

LAUR. THEOD. GRONOVIUS,

senator of Leyden, where this volume was published in 1781. It contains plates (of the rarer objects), among which are two of shells, with upwards of twenty correct figures; and there is an excellent scientific description of 589 species, conformable to the Linnean method. Some of these have not been described by any other author.

DE JOUBERT,

the author of a "*Mémoire sur une Coquille de l'Espèce des Poulettes pêchée dans la Méditerranée,*" merits the same remark as has been made with respect to his countryman Fougeroux, and his memoir occupies the same work. It relates to recent and fossil *Anomiæ*, of which there are several figures.

KÄMMERER,

a German testaceologist, described the collection of the Hereditary Prince of Schwarzburg-Rudolstadt. Though the work be

 little

little more than a catalogue, it is adorned with very good figures, and many of the species are of considerable rarity. It is wholly in the German language. The plates are twelve in number, exclusive of the four subjoined to an appendix to this work, published at Leipsic under the title of "*Nachtrag zu der Conchylien im Fürstlichen Cabinette zu Rudolstadt.*"

The *Fauna Groenlandica* of

OTHO FABRICIUS

deserves a distinguished place among Testaceological works, as it contains an ample and satisfactory description of fifty-seven species of shells, some of which had not been described by any author before. The arrangement is that adopted by Müller; and, like him, Fabricius pays minute attention to the structure and habits of the contained animals.

We are indebted to the celebrated

PALLAS

for the description of several new species of *Testacea*, in his *Miscellanea Zoologica*, and also in the *Spicilegia Zoologica*; and he has not contented himself with making known non-descript species, but has, moreover, rectified the accounts given by preceding authors of others well known before. Few labourers in the paths of natural history have more largely extended every branch of it than this truly scientific observer. The Testaceologist will consult with much satisfaction his remarks on the *Serpulæ*, contained in the work first mentioned, and called forth by the occasion of describing that remarkable species the *S. gigantea*. He adduces many anatomical facts which seem to have been unknown to Linnæus, and which occasion some anomalies in that genus. The 10th *fasciculus* of the *Spicilegia* contains good figures of some rarer shells

shells of different *genera*, and also accurate descriptions. There are histories of new species by the same author in the *Nova Acta Acad. Petrop.*, with figures. These species are *Serpula Spirillum*, *Lepas cariosa*, *Pholas Teredula*, *Chiton amiculatus*, and *Helix coriacea.*

The 64th volume of the *Philosophical Transactions* contains some curious facts relative to what has been called the *reviviscence* of snails, communicated to the Royal Society by

DR. MACBRIDE.

This is a subject more particularly interesting to the physiologist, but cannot be considered as foreign to the science of Testaceology in general.

The following year the celebrated

BONNET

published some experiments on the regeneration of the head of the common Land-snail, which appear among his other works. These experiments were pursued likewise by Müller in the *Journ. de Physique*, and by

J. AND. MURRAY,

in a *Programma*, at Göttingen, the year after Bonnet's observations appeared.

This is the proper place to notice the labours of our countryman

PENNANT,

whose *British Zoology* is the earliest work professing to treat of the animals of our island after the Linnean method, and who ought, therefore, to be considered as having commenced a new æra among English naturalists. The three first editions of this work,

work, however, did not comprehend any of the *Vermes*, and it was not until the year 1778 that a 4th volume made its appearance, with descriptions and figures of that tribe. This volume contains an enumeration of 163 species of *Testacea*, with concise descriptions, and 56 plates exhibiting about 200 figures of them. Most of these plates are valuable for reference, but some of them are executed less carefully than could have been wished. In the descriptive part the author has translated pretty closely the specific characters given by Linnæus, whenever they could be had; but there are several species of which the former is to be looked upon as the first describer. It is very remarkable, however, that he should have wholly omitted others which had been noticed by Lister and Petiver, and which are unquestionably natives of our island.

In the *Nova Act. Reg. Soc. Scient. Upsal.* we find a description of *Anomia Caput Serpentis* by this author, with a figure subjoined. It may be remarked that the same shell is described in the same volume by the pen of Linnæus, whose figure (with those of *Anomia patellæformis*, noticed in the same paper,) occurs in the plate that contains Pennant's.

We have next to mention the *Introductio ad Historiam Naturalem*, and the *Deliciæ Faunæ et Floræ Insubricæ*, of the learned

SCOPOLI,

both of which are the productions of great science, aided by genuine ardour of investigation. Scopoli was well acquainted with the labours of his predecessors in Testaceology, as well as in other branches of natural history, and has availed himself of them towards perfecting the system of Linnæus, whose *genera* he has considerably augmented,—more so, perhaps, than is consistent with the general simplicity and facility of application of the original.

ginal. For such of Linnæus's terms as have justly been considered objectionable, on account of indelicacy, this author has substituted others which, though not equally expressive, perhaps, are sufficiently intelligible. In the specific descriptions, the shell and the animal have been alike regarded; and the author seems to have steered a sort of middle course between the advocates for a system founded chiefly on the former, and those who have made the latter the chief subject of their attention.—Our remarks hitherto have had respect only to the *Introd. ad Hist. Nat.* In the other work the merit consists in the figures, which are finely drawn, and contribute greatly to the general splendour of the volume. Plate 25 of Part I and 24 of Part II exhibit solely shells, correspondent to concise descriptions of seven remarkable species.

The period of which we are treating was peculiarly productive of valuable publications in Testaceology. In 1778

BARON BORN,

so well known by his writings on mineralogy, presented to the public his description of the shells preserved in the museum of the Empress Queen at Vienna. This work was undertaken by the express command of Her Imperial Majesty, and forms a thick octavo volume, in Latin and German. The author has closely followed the Linnean method, and his descriptions exhibit the peculiar terseness and precision introduced into natural history by that great writer. His synonyms are copious and correct, and he does not appear to have fallen into that frequent error among naturalists—the undue multiplication of species. In this work the number of the latter is 616, and references are made to them by their German, Dutch, French, and English names, in four distinct *indices*.—Two years after the publication of the descrip-

scriptive part of the museum, appeared the sumptuous and splendid folio which illustrates it by eighteen admirable engravings (containing upwards of 200 coloured figures), besides vignettes and other ornamental appendages. This volume cannot be said to have been surpassed by any similar performance, either in elegance or utility, and may justly be considered as one of the most valuable works of which the lover of shells can become possessed.

In 1776 were published the "*Elements of Conchology*" of

DA COSTA.

As this author wrote after Linnæus, it might be expected that a system, in which he professes to differ materially from that great naturalist, would have contained some important improvements. It is worthy of remark, however, that, after abusive strictures on the Linnean system, Mr. da Costa builds his own chiefly on the general characters which Linnæus himself has made use of. For example, the turbinated univalves are characterized by the shape of the aperture, and the bivalves by the nature of the hinge. When the student is informed that he must make himself acquainted with four orders, sixteen families, and thirty-nine *genera* of univalves, and with three orders, sixteen families, and twenty-three *genera* of bivalves and multivalves, before he arrives at specific distinctions, none of which our author considers in this performance, he will most probably abandon the new system in disgust. It cannot but be acknowledged that the volume contains some judicious remarks on the study of this branch of natural history, and on the authors who have treated of it. There are also useful instructions for collecting, cleaning, and preserving specimens. Still more acceptable to the public were two other works of this author; one of which, however, was on too extensive a scale to admit

admit of being completed; we mean the "*Conchology or Natural History of Shells,*" which was published, anonymously, in folio numbers, but never proceeded beyond twenty-six pages of letter-press and twelve plates. The shells figured are chiefly of the *genera* of *Patella, Haliotis,* and *Serpula.*—The *British Conchology* was the work that conferred most reputation on this writer; and it certainly formed a valuable addition to the natural history of our island. He has described many species not noticed by Pennant, yet some of these are not well ascertained to be natives of Great Britain; nor are Linnæus's synonyms in every instance correctly applied. He follows the system laid down in his *Elements of Conchology.* The descriptions are minute and accurate, and calculated for both the English and the French reader, each of those languages being employed throughout the volume. It is much to be wished that every species mentioned in it had been figured, especially as the plates exhibit 124 species out of the 152. These plates are 17 in number, and coloured; but the accuracy neither of the engraving nor of the colouring is much to be commended. For the most part, however, the subjects are pretty readily recognizable.

We are glad to have to record in these Testaceological memoirs the name of a female physiologist,

MASSON LE GOLFT,

some remarks by whom on the re-production of parts of Muscles occur in the *Journal de Physique.*

The same work contains an account of lithophagous marine animals, written by

DICQUEMARE.

The locomotive faculty of certain *Ostreæ* is treated of by the same author in the 28th volume of the abovementioned journal.

 MOLINA,

MOLINA,

in his Natural History of Chili, includes the *Testacea* of that country, which he has described in a scientific manner.

The reproduction of the head of the common Snail, a subject to which the attention of physiologists had been first directed by Bonnet, occupied at this time the notice of one of the most sagacious observers of the age, the justly celebrated

SPALLANZANI,

whose experiments and observations may be found amply detailed in the *Mem. della Soc. Ital.* for the years 1782 and 1784. This valuable paper contains a variety of very curious facts; and the first part of it is illustrated by nine figures, which exhibit various states of the decapitated animal.

In recording the description given by

GIOENI

of a new genus found on the shores of Catania, we have, unfortunately, only to commemorate a very remarkable mistake made by that naturalist, the supposed new genus having been discovered to be merely the gizzard of *Bulla lignaria*, so well described by our countryman, Mr. George Humphreys, in the 2d volume of the *Linnean Transactions*. This detection of the mistake, however, was not made until seventeen years after the publication of Gioeni's book. So little suspicion was entertained of the substance thus brought to notice not being a real shell, that it obtained a scientific name as such (*Triola Gioenii*) from Professor Retzius, and occupied a place in the system of the late M. Bruguiere, under the appellation of *Gioenia Sicula*. For the ascertaining of its real nature we are indebted to M. DRAPARNAUD, whose account may be found in the *Nouv. Journ. de Physique*.

LIGHT-

LIGHTFOOT

(well known from his *Flora Scotica*) was author of a description of five species of *Testacea*, either wholly unknown to, or not duly noticed by, any of his predecessors. This gentleman was deservedly considered as one of the most able Linnean scholars of his time, and, from his constant opportunities of access to the Portland museum, had rendered himself particularly conversant in conchology; a circumstance sufficiently evinced in the paper of which we have been speaking, and which appears in the 76th volume of the *Philosophical Transactions*. The figures, also, accompanying the paper are very correctly drawn.

In the year 1784

MARTYN,

a dealer, began one of the most beautiful and costly conchological works this country has ever seen. It bears the title of the *Universal Conchologist*, and was intended to exhibit a figure of every known shell, drawn and painted after nature. The author began with the non-descript species collected in the different voyages to the South Seas after the year 1764. His work is prefaced with general remarks, in French and English, an account of the more remarkable cabinets of shells existing in Great Britain, and some observations relative to Testaceological writers. It contains also explicatory tables, exhibiting the name of each shell, according to the author's system, the name it bears in the Linnean, the degree of rarity, the *habitat*, and the collection in which it was found. But, before this ingenious artist had completed his two volumes of South Sea shells, he discovered the impossibility of procuring purchasers sufficient to compensate him for his labour and expense,—a misfortune generally experienced by private individuals who embark in such extensive and sumptuous undertakings. He, therefore, did not proceed beyond 160 plates;

 which,

which, however, as they include all the species then known to the southern navigators, may be considered as constituting a complete work, so far as it goes, and it was all that Mr. Martyn had absolutely *engaged* himself to execute. There is only one species on a plate, but each is exhibited in different aspects, with incomparable elegance, and with great correctness of drawing and colouring.

In the same year with the first volume of the *Universal Conchology* appeared a description of the minute shells found on the Sandwich shores by

WILLIAM BOYS,

with whose name ought also to be joined that of

GEORGE WALKER,

by whom considerable additions were made to the observations of Mr. Boys, and who drew the figures. This work contains three plates, exhibiting ninety species (inclusive of three *Mollusca*), both of the natural and of a magnified size. Each species is concisely described in Latin, agreeably to the Linnean method, and accompanied by some observations in English relative to colour, degree of rarity, &c.

LEFEBURE DES HAYES

gave a very full description, accompanied by figures, of the *Chiton squamosus*, which will be found in the *Journal de Physique* for 1787.

The "*Nova Testaceorum Genera*" of Münter Philipsson were published, as an Inaugural Dissertation, at Lund, under the Presidency of

RETZIUS.

This performance contains many judicious remarks relative to the Linnean *genera*, which the author proposes in some instances

to

to divide; and he forms three from the authority of Linnæus himself, if Acharius (by whom the information of Linnæus's intentions was communicated to Retzius) be correct. There can be no doubt that the *Mya Perna* of the *Syst. Nat.* admits of being made a distinct genus, under which may, very properly, be comprehended some of the ventricose species of *Mytilus*. The appellation of *Perna* is accordingly given to this family, and that of *Unio* to the two perlaceous species of *Mya*, viz. *Margaritifera* and *Pictorum*. The four last species of the original genus *Ostrea* appear to have been afterwards intended by Linnæus to form another family, to be called *Melina*. According to our author, the *Anomia* consists of four very different divisions of shells, which he proposes to designate by the generic terms of *Anomia*, *Crania*, *Terebratula*, and *Placenta*. By turning to the *Anomiæ* as they stand in the 12th edition of the *Systema*, the reader will easily discover what species are meant to be comprehended under each of these *genera*; and how partial soever he may be to the original arrangement of Linnæus, he will not be disposed, perhaps, to accuse the Testaceologist of whom we are treating of any *rashness* of reform.

There is a scientific description, with figures, of *Venus lithophaga*, published by the Professor in the *Mem. de l'Acad. Roy. des Sc.* for 1786.

In the same work for 1788 we find an author of the name of

LE GENTIL,

who describes a *Patella* (apparently the *cæruleata*) found on an aquatic plant, which, with the shell, is figured in the 20th plate of that volume.

CORDINER.

In the plates accompanying Mr. Cordiner's Description of Ruins, &c. in North Britain are several figures of *Testacea*, which

are

are represented with the animals for the most part complete; but the engravings are slight, and the shells are intermingled with Zöophytes.

The microscopic subjects described by

SOLDANI

are principally shells, which this author discovered at Portoferrara, the island del Giglio, and on the shores of Castiglioncello, la Follonica, &c. The work does not exhibit much method or science; but the species figured in it are extremely curious, many of them being wholly unlike any of the larger and well known ones. There are 148 plates, in which the shells are represented both of their natural size and magnified.

As a physiological dissertation on the subject of *Testacea*, the letter of

BONVICINI

to Professor Girardi, inserted in the *Mem. della Soc. Ital.*, ought to be mentioned here. It contains several curious experiments relative to the organ of sight in the Snail tribe.

In the "*Magazin Encyclopédique*" some facts respecting the life of the *Lepas anatifera* may be found. They were communicated by

M. MESAIZE,

who seems to have had opportunities of paying considerable attention to this singular species.

With the year 1789 commenced the Helminthological part of the grand work carried on in France under the title of "*Encyclopédie Méthodique.*" This department had been undertaken by

BRUGUIERE

(the well known traveller in the East), who appears to have been fully qualified for the completion of the laborious task; but, unfortunately

fortunately for natural history and his nation, he was cut off by a premature death, just after he had completed the 1st volume (which does not go beyond the letter C) of the article *Vers*. In the preface to this article we are presented with the method of arrangement which he intended to have pursued, and which is obviously founded on that of Linnæus: in fact, the author professes to deviate from it no further than he conceives himself to be required by the discoveries subsequent to the publication of the *Systema*. The number of *genera*, however, in the French zoologist's order of *Testacea* is nearly double that of Linnæus's, being sixty-one instead of thirty-six. Only two *livraisons* of plates containing shells have hitherto come to our hands; but such is the originality of the figures, and the excellence of their execution, that, incomplete as they are with respect to the letter-press, they form by themselves a very valuable work to be referred to by other authors.—There occur some interesting papers relative to *Testacea* by M. Bruguiere in the *Journal d'Hist. Nat.* (of which that gentleman was a principal conductor); in one of these he has treated, at considerable length, of the formation and growth of the *Porcellanea*, adducing a variety of new and curious facts on that subject.

The "*Naturalist's Miscellany*" of our countryman

DR. SHAW

is too well known to require any detailed mention in this paper; and, even if it had not been inconsistent with our plan to have discussed the merits of contemporary English authors, we could not, with propriety, enter upon an analysis of a work which is not yet completed. We shall, therefore, content ourselves with pointing out its place in the general history of Testaceology.

The

The "*Zoologia Adriatica*" of the Abbé

OLIVI

deserves a place among Conchological performances, for it contains a very scientific account of all the shells found in the Gulf of Venice. This author makes known seven new species, which are well figured, and very fully described.

It was not reserved for the anatomist alone to illustrate the physiology of the testaceous tribe, for chemistry now began to lend its aid towards extending and improving this interesting subject of inquiry. In the *Ann. de Chimie* we find

M. VAUQUELIN

treating of the respiratory process in the *Helix Pomatia.* This eminent chemist proves, in the course of his observations, that the *Vermes* require vital air for the excitement of their pulmonary system as well as other animals, and that they cannot live without it. But the most curious fact is, that the species above mentioned will respire azotic and carbonic acid gas as long as any oxygen remains combined with either;—whence M. Vauquelin is induced to think that this *Helix* may be a good eudiometer.

The *Journal d'Hist. Nat.* for the same year contains an article entitled "*Observations sur la Génération des Buccins d'Eau douce,*" from which observations

M. RIBAUCOURT,

the writer of them, is induced to conclude that all the species of that tribe are viviparous. The *second* volume of that instructive work has the anatomy of *Patella vulgaris,* which is written by

M. CUVIER,

and illustrated by a plate, representing both the animal and the shell in various points of view. This very able comparative anatomist

tomist has distinguished himself by other dissections of *Testacea*, which will be found in the *Annales du Museum National*, and which we have much satisfaction in particularizing. His first memoir in that journal relates to the animal of *Lingula anatina* of Lamarck (*Patella Unguis* of Linnæus), the parts of which are admirably exhibited in the 17th plate. In the subsequent number *Bulla aperta* (*Bullæa* of Lamarck) is described and figured with equal ability. It is by such minute and accurate examinations that species are definitively fixed, and we cannot forbear expressing a hope that M. Cuvier will continue to present us with other examples of the successfulness of his researches among this still imperfectly known order of animals.

Several minute and other shells not before known are described in the *Trans. of the Linn. Soc.* by

JOHN ADAMS,

who discovered them on the coast of Pembrokeshire. The descriptions, which are perfectly scientific, are accompanied by figures. In mentioning the name of Mr. Adams, the authors of the present paper, who were so fortunate as to enjoy his correspondence on Testaceological subjects, cannot omit paying a tribute of respect to his memory, from having witnessed the enthusiasm and perseverance with which he pursued the study of nature; nor can they help reminding their fellow-members of the loss they sustained in the untimely death of one who gave such unequivocal proofs of usefulness and ability.

It is a task as laborious as it is unlimited to push the examination of natural objects beyond the ordinary powers of the senses; and it may, perhaps, be questioned by some, whether such pursuits lead to any useful practical purposes: yet the supplying of

links in the chain of organized creatures, the multiplication of analogies, and the tracing of changes produced in the different stages of the growth of animals, cannot fail to give curious and interesting results to the profound naturalist. The investigation of microscopic shells, so zealously pursued by a Plancus and a Soldani, has been taken up with no small success by

M. M. LEOPOLD À FICHTEL

AND

J. P. CHARLES À MOLL,

whose elegant and instructive work on this subject deserves particular mention, since it is to be considered as the fullest catalogue of minute *Testacea* that has yet been published. It is embellished with beautifully coloured plates, which represent the several subjects both of the natural and of a magnified size. The descriptions are given in two languages (viz. the Latin and the German), and we must not omit our tribute of applause to the ingenious authors for having thus shown a respect for the scientific world in general, as well as for their own countrymen in particular. It is an example which, as we have before ventured to remark, ought to be universally adopted; unless the advantages of knowledge are intended to be purely local, like that which relates to the trade and traffic of nations; or unless it be thought necessary for human life to be wholly occupied in the acquisition of languages. The *genera* of *Argonauta* and *Nautilus* form the principal subjects of this volume; and many species appear under each of these which had been either not duly observed, or wholly unnoticed, by preceding writers.

M. LAMARCK,

M. LAMARCK,

whose sentiments respecting the Linnean Testaceology we have quoted (in a former part of this paper) in support of our own, has strong claims to a distinguished place among the writers on this branch of pursuit. The *Journal d'Hist. Nat.*, *Mem. de la Soc. d'Hist. Nat. de Paris*, and the *Annales du Mus. Nat.* contain sufficient proofs of the close attention which he has paid to the order of *Testacea*. In the first of these works we find some judicious remarks of this eminent naturalist on the Testaceological system of Bruguiere, and in the second he has presented us with a sketch of the method adopted by himself. Whether the number of the *genera* employed in the latter (which are sixty-three more than are used in the former) ought to be a ground of preference, we do not presume to determine; but the system of M. Lamarck must be considered as an entire new modelling of the Linnean; and we cannot help questioning whether it has improved the perspicuity of the original. In the *Ann. du Mus. Nat.* M. Lamarck has described a new genus belonging to his order of *Crustaces conchyliferes* under the name of *Tubicinella*.—It is from this author that we may expect the continuation of the article *Vers* in the French *Encyclopedie*, so unfortunately interrupted by the death of M. Bruguiere.

WILLIAM GEORGE MATON

has described, in the *Trans. of the Linnean Society*, a species of *Tellina* not noticed by Linnæus. In his *Observations on the Western Counties* frequent mention is made of *Testacea* found in that district; some of which had not been described as natives of the British islands before; and *Turbo rudis* is here first made known as a new species.

 MR.

MR. HATCHETT

is the only author, with whose writings we are acquainted, that has scientifically investigated what may be called the chemical characters of shells; a comparison of which with those derived from external structure cannot but be highly curious and interesting to the philosophical naturalist. To the disciple of Linnæus it is peculiarly satisfactory to perceive that so many of Mr. Hatchett's experiments tend to establish the propriety of distinctions adopted by that illustrious naturalist. We would only refer the reader to the instance of the *Echinus*, the chemical characteristic of which genus proves, in opposition to Klein, the correctness of Linnæus, in placing it among the crustaceous instead of the testaceous tribe; the presence of the *phosphate of lime* detected in the covering of the *Echinus* distinguishes the latter from testaceous substances, which consist only of *carbonate* of lime mixed with the gelatinous matter. When one science can thus be made to remove unavoidable ambiguities in another, a beautiful example is established of the intimate connection that subsists between all the various branches of natural knowledge.

In the year 1799

MR. DONOVAN

began the publication of the *Natural History of the British Shells*, including figures and descriptions of all the species hitherto discovered in Great Britain, systematically arranged in the Linnean manner, with scientific and general observations on each. Of this work five volumes in octavo have appeared, comprising 180 plates, with coloured figures; but, as it is not yet completed, we have only to observe, that the author has given several new species, and that he has rectified many errors of preceding writers.

The

The student will find much useful illustration of the generic characters of bivalves in the 6th volume of the Linnean Society's Transactions; in which

MR. WILLIAM WOOD

has described and figured the *hinges* of such shells of that division as are found in Great Britain.

M. DUFRESNE.

From this writer we have some remarks on the *genera* of *Tubicinella*, *Cornula*, and *Balanus* (of Lamarck), with admirable figures of *Coronula Balænaris* and *Tubicinella*, in the *Ann. du Museum.* The communication is entitled "*Notice sur les Balanus.*"

The last writer whom we have to record in this historical account is

GEORGE MONTAGU, ESQ.,

who, by indefatigable perseverance in his researches, and by a long residence near the sea coast, has been enabled to make considerable additions to the British *Testacea*, and to gratify the zoologist with descriptions of, and various particulars relative to, many of the animals of that order whose history was much less perfectly known before. He has enumerated nearly 470 species; upwards of 100 of which had either not been described by any former author, or had now first been ascertained to be British. Sixteen coloured plates accompany the work, on which are delineated some of the shells described, but not figured by former writers,—a few already known, which are necessarily introduced for the sake of comparison,—and many first discovered by Mr. Montagu himself; of the latter, however, about thirty are unaccompanied by figures. This author adopts the Linnean system; but has deviated from it in placing many Linnean *Helices* under the genus

Turbo.

Turbo, and arranging all the depressed species of the former without regard to the shape of the aperture. A new genus (*Vermiculum*) is introduced for the purpose of containing such of the *Serpulæ* as do not agree with the generic character of being fixed to other bodies. The whole of the work is in the English language; so that the author cannot be said to have employed the Linnean terminology (strictly so called) or the Linnean mode of description; but this is a circumstance which will not be regretted by ordinary readers.

N. B. In the following *Systematical* enumeration of Testaceological writers, and of their works, the numbers annexed to the names of the former refer to the pages in the preceding account wherein these writers are respectively mentioned.

SYLLABUS

SYLLABUS CLASSIUM

IN

SYSTEMATE TESTACEOLOGORUM.

1. HISTORICI
(Qui Testacea generaliter tractavere).

2. MONOGRAPHI
(Qui unicum genus, familiam, vel speciem descripserunt).

3. TOPOGRAPHI
(Testaceorum alicujus orbis terrarum partis descriptores. Peregrinatores, &c.).

4. MUSÆOGRAPHI
(Qui Musæa, Collectiones Testaceorum descripserunt).

5. MICROGRAPHI
(Testaceorum quæ non nisi oculis armatis sunt distinguenda descriptores).

6. THAUMATOGRAPHI
(Qui monstrosa, vel mirabilia in Testaceis indicarunt).

7. ANATOMICI
(Qui Vermium Testaceorum partes dissectas scrutati sunt).

8. PHYSIOLOGI
(Qui præcipue mores, habitus, naturam Vermium Testaceorum vel generaliter, vel specialiter, exploraverunt).

9. SYSTEMATICI
(Qui Testacea in ordinem aliquem redegerunt).

10. NOMENCLATORES
(Qui nomina tantum Testaceis imposuerunt, vel explicarunt).

11. COMMENTATORES
(Qui scripta aliorum dilucidarunt).

12. ICHNIOGRAPHI
(Qui figuras vel ligno vel ære incisas exhibuerunt).

HISTORICI.

I. HISTORICI.

ΑΡΙΣΤΟΤΕΛΗΣ. (121)
(Mortuus circa A. 322. ante C.)
Περι Ζωων Ἱστοριας το Δ. κεφ. δ.

CAIUS PLINIUS SECUNDUS. (122)
(Floruit A. D. 80.)
Historia Mundi. Lib. 9.

ΑΙΛΙΑΝΟΣ. (123)
(Mortuus circa A. D. 140.)
Περι Ζωων ἰδιοτητος. Ιο. γ.

VINCENTIUS. (123)
Speculum Naturale. Venet. 1494. fol.

ALBERTUS MAGNUS. (123)
De Animalibus. Venet. 1495. fol.

ADAM LONICERUS. (123)
Historiæ Naturalis opus novum. Francof. tom. 1. 1551. fol. tom. 2. 1555. fol. cum figg. ligno incisis.

PIERRE BELON. (124)
De Aquatilibus. Lib. 2. Paris. 1553. 8vo. p. 448. cum figg. ligno incisis.

GULIELMUS RONDELETIUS. (124)
Universa Aquatilium Historia. Lugd. 1555. fol. cum figg. ligno incisis.

CONRAD GESNER. (125)
Lib. 4. *de Piscium et Aquatilium Animantium Natura.* Tiguri. 1558. fol. Francof. 1620. cum figg. ligno incisis.

GEOFFROY LINOCIER. (126)
Histoire des Poissons. Paris, 1584. 12mo. avec figg. Paris, 1619. 12mo. imprimée avec son Histoire des Plantes.

FRANCESCO IMPERATO. (126)
Dell' Historia Naturale di Ferrante Imperato Napolitano Lib. 28. Neap. 1599. fol. con figg. in ligno.

ULYSSES ALDROVANDUS. (127)
Tomus tertius de Mollibus crustaceis, testaceis, et zoophytis. Bononiæ. 1606. fol. cum figg. ligno incisis.

FABIUS

FABIUS COLUMNA. (127)

Aquatilium et Terrestrium aliquot Animalium aliarumque Naturalium rerum Observationes. Romæ 1616. 4to. cum. figg. æri incisis, cum notis D. MAJOR, M.D. Kiliæ. 1675. 4to. cum figg. ligno incisis.

JOANNES EUSEBIUS NIEREMBERGIUS. (128)

Historia Naturæ. Antverp. 1635. fol. cum figg. ligno incisis.

JOANNES JONSTON. (130)

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ERRATA.

Page 6, l. 7, for *in*, read *on*.
131, l. 12, for *this author*, read *De Rochfort.*
136, direction word, for *Marsigli*, read *An.*
137, l. 10, for *by a few years afterwards*, read *a few years afterwards by.*
—, l. 17, for *been seen*, read *having been seen.*
171, l. 18, for *though*, read *even if.*
173, l. 11, for *species of Pholas*, read *Teredo.*
—, l. 12, 13, for *Teredo navalis and the*, read *that shell and certain.*
210, l. 11, for *fullest*, read *most accurate.*
—, l. 26, for *each of these*, read *the latter.*
213, l. 28, for *of the former*, read *as Helices.*
232, l. 10, for *Amst.* 1715, read *Harl.* 1719.

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Les Délices des Yeux et de l'Esprit, ou Collection générale des différentes Espèces de Coquillages que la Mer renferme. Nuremb. tom. 1. 1760. tom. 2. 1773. 4to. avec planches colorées.

Deliciæ Naturæ selectæ. Nuremb. 1766. fol. tom. 1mus, cum tabb. æneis 7. coloratis.

DUCHESNE. (188)

Recueil des Coquilles fluviatiles et terrestres qui se trouvent aux Environs de Paris. 3 planches. fol.

PETER FORSKÅHL. (195)

Icones Rerum Naturalium quas in Itinere Orientali depingi curavit. Editæ à C. NIEBUHR. tab. 40ma. (Havniæ, 1776. 4to.)

OTHO FREDERIC MULLER. (*Vide* TOPOGRAPHOS)

Animalium Daniæ et Norvegiæ rariorum ac minus notorum Icones. Havniæ, 1777. fol. cum tabb. æn. 40.

THOMAS MARTIN. (203)

Universal Conchologist. London, vol. 1. 1784. vol. 2. 1786. fol. with 160 most elegant plates.

JEAN BAPTISTE LAMARCK. (207)

Vers Testacés, dans le "Tableau Encyclopédique et Méthodique." (Paris, 1797-1798. 4to.) Livraison 62-64. Planches 390.

XIII. *An*

XIII. *An Illustration of the Grass called by Linnæus Cornucopiæ alopecuroides. By James Edward Smith, M.D. F.R.S. P.L.S.*

Read November 1, 1803.

Some time between the publication of the second edition of the *Species Plantarum* and that of the first *Mantissa*, Linnæus received from Professor Arduino a single specimen of an Italian grass, of a most extraordinary appearance, which the learned botanist who sent it conceived might possibly form a new genus. The annexed figure (Tab. XII. fig. 1.) shows the exact appearance of this original specimen. Linnæus remarked its great resemblance to *Alopecurus pratensis,* at the same time noticing the inflated sheath of its upper leaf, in which he found it agree with some species of *Phalaris.* Its most striking peculiarity however, a membranous cup embracing the lower part of the spike, so strongly accorded with the genus *Cornucopiæ,* that Linnæus without scruple so determined it; being, doubtless, well pleased to add a reinforcement to that celebrated and uncommon genus, of which only one species had before been discovered. Nor did he in this determination lose sight of his usual accuracy. On a dissection of the flower he found the corolla of one valve only, as in *Cornucopiæ,* in which mark indeed that genus agrees with *Alopecurus,* being distinguished from it, as from all other grasses, only by the funnel-shaped involucrum which contains the flowers. This part being curiously and regularly notched in the original *Cornucopiæ,* and the flowers beardless, while, in the grass before us, the flowers are awned, and the involucrum nearly entire, furnished Linnæus with sufficient specific distinctions; while the general habit and structure, even the inflated

inflated sheaths of the leaves, evinced a generic affinity between the two plants. So great indeed is this affinity, that, but for the involucrum, the original *Cornucopiæ cucullatum* would be an *Alopecurus*; for we have lately become acquainted with some species of the latter, whose flowers more nearly agree with it in structure than those which Linnæus knew; while the *Cornucopiæ alopecuroides* turns out the very identical *Phalaris utriculata* of Linnæus, which is itself a real *Alopecurus*.

I have in another place (*Tour on the Continent, vol.* 2. *p.* 293.) mentioned that Linnæus described his *Phalaris utriculata* from other authors, without seeing it; a circumstance which may excuse his very erroneous suspicion of its not being distinct from *Phalaris paradoxa*, as well as his not finding it out to be an *Alopecurus*, or that the new grass of Arduino was the very same thing. Both these discoveries occurred to me at once, in examining *Phalaris utriculata* for the purpose of making out its full description for the *Flora Græca*. I found it in character and habit a decided *Alopecurus*, and that some new grasses, which Dr. Sibthorp, from their affinity to *Phleum Gerardi* of Jacquin, had considered as species of *Phleum*, were to be referred to *Alopecurus* also: even the *Phleum Gerardi* perhaps, notwithstanding its having a small inner valve to the corolla, ought, as the accurate Gerard suspected, to be arranged under *Alopecurus*. Having made this discovery, the recollection of *Cornucopiæ alopecuroides* came into my mind. It had always been an obscure plant, known only by the Linnæan specimen, nor ever found by any botanist except Arduino. Sir Joseph Banks had more than once looked at the specimen with me. His penetrating judgment suspected something anomalous in it, and I was the more ready to acquiesce in his suspicions, from the plant having been found only once: but neither of us could recollect to what it really belonged; for on comparing it carefully with *Alopecurus pratensis*, to

to which Linnæus says it is so very like, they proved decidedly distinct. On turning to the herbarium while full of the idea of *Phalaris utriculata*, or rather, as it must now be called, *Alopecurus utriculatus*, I perceived at once that this wonderful *Cornucopiæ* was no other than a singular variety of that species, characterized by the cup or ruffle which unfolds the base of the spike. With great satisfaction I perceived rudiments of this ruffle on the grass in its ordinary state, though they had escaped the observation of the accurate Scopoli (*Deliciæ Insubricæ, v.* 1. *t.* 12.) and the more exact Baver; and further observed that it does not in any instance run down into a sheath, as Professor Arduino's specimen would, at first sight, induce one to suppose; but that the stem is, in his specimen, much thicker than usual, probably from the same cause of monstrosity which produced the dilated ruffle. Indeed in the true *Cornucopiæ* the notched cup does not form one common cavity with its horn-like support, the latter being truly a flower-stalk, swelling upwards, hollow within, but closed at the top, where it bears the head of flowers and the notched involucrum. Hence it appears how closely *Cornucopiæ* and *Alopecurus* are really allied; and it may afford amusement as well as instruction to the speculative systematic botanist to consider, how far, in this or any other instance, the existence of some strange peculiarity in the parts of fructification themselves, which this of the *Cornucopiæ* is not, should lead him to form distinct genera, when general structure and habit do not authorize his proceedings. On the other hand, when other differences, too slight either separately or collectively to form a character themselves, show a real distinction, we may reasonably expect, and should readily seize, some technical character, by which we may define and stamp the newly discovered genus.

Norwich,
October 31, 1803.

XIV. *Description of such Species of Chironia as grow wild at the Cape of Good Hope. By Sir Charles Peter Thunberg, Knight of the Order of Wasa, Professor of Botany at Upsal, F.M.L.S.*

Read November 1, 1803.

GENTIANA, *Swertia*, *Exacum*, *Chlora* et *Chironia*, genera sunt inter plantas adeo affinia et in non paucis similia, ut admodum sit difficile dictu, sive unicum genus constituere debeant, sive in plura abire diversa. Hac de re non pauci dubii hæserunt botanici. *Exacum* minimo staminum numero, scilicet tantum 4, instruitur; *Chlora* maximo, nimirum 8 usque 12. *Chironia*, *Swertia* et *Gentiana* constanter quinarium staminum numerum servant, sed variant corolla 4- et 5-fida, antheris lævibus atque spiralibus, sic ut plures species jam ad hoc, jam ad aliud genus relatæ fuerint, et *Gentiana*, cujus species semper numerosissimæ, non raro in plura genera dilacerata evaserit.

Chironia, quod maxime singulare et notatu dignum, *baccata* fructum producit baccatum, a ceterarum capsulis valde dissimilem.

Gentiana et *Swertia* præterea gaudent stigmatibus duobus sine stylo, dum reliquæ omnes pistillo unico instruuntur. *Swertia* instruitur etiam nectario, et *Gentianæ* species plurimæ inconstanti figura corollæ, mirum in modum, ludunt.

Inter hæc genera, *Chironiæ* plurimæ species occurrunt spontaneæ, uti etiam *Exaci*, in Promontorio Bonæ Spei dicto. Cumque *Chironiæ* species in Africa australi, loco earum natali, plures examinare

Chironia nudicaulis

Chironia tetragona

aminare mihi contigerit vivas. Descriptiones harum, tam quæ ante notæ fuerunt, quam quæ novæ mihi obvenerunt, illustris Societatis ulteriori scrutinio subjectas volui.

Upsal.
d. 29 Jul. 1803.

CHIRONIA TETRAGONA.

CH. foliis ovatis glabris, caule suffruticoso, calycibus ovatis carinatis.

Tab. XII. Fig. 2.

Chironia *tetragona.* *Linn. Syst. Vegetab.* xiv. *p.* 229. *per Gmelin. p.* 392. *Suppl. Pl. p.* 151. *Thunb. Prodrom. Plant. Capens. p.* 35.

Crescit in Capite Bonæ Spei prope Puspasrivier.

Floret Octobri et sequentibus mensibus.

Caulis basi frutescens, totus glaber, ramosus.

Rami e basi sæpe plures, ramulosi, tetragoni, erecti, pedales.

Ramuli alterni, tetragoni, flexuoso-erecti, subfastigiati.

Folia opposita, sessilia, ovata, obtusiuscula, integra, trinervia, frequentia, erecto-imbricata, internodiis longiora, unguicularia.

Flores in ramulis terminales, solitarii, purpurei.

Calycis laciniæ ovatæ, carinatæ, viscosæ, corolla triplo breviores.

Differt a *Chironia angulari,* cui valde similis:

1. Corolla purpurea; et imprimis
2. Calycis laciniis carinatis ovatis.

CHIRONIA NUDICAULIS.

CH. foliis ovatis glabris, caule herbaceo, calycibus subulatis.

Tab. XII. Fig. 3.

Chironia *nudicaulis.* *Linn. Syst. Vegetab.* xiv. *p.* 229. *per Gmelin. p.* 391. *Suppl. p.* 151. *Thunb. Prodrom. Pl. Capens. p.* 35.

Crescit in summitate Montis Tabularis.

Floret Januario, Februario.

Caulis herbaceus, totus glaber, mox a radice ramosus.

Rami subradicales, plures, elongati, subsimplices, raro superne divisi, laxi, flexuoso-erecti, subtetragoni, pedales.

Folia opposita, sessilia, ovata, obtusiuscula, integra; inferne aggregata, pollicaria; superne remotissima; suprema lanceolata.

Flores in ramis terminales, solitarii, purpurei.

Calycis laciniæ lanceolatæ, elongato-subulatæ, erectæ, longitudine tubi corollæ.

Differt a *Chironia trinervia:*

1. foliis obtusioribus.
2. ramis elongatis.
3. calycis apice subsetaceo.

CHIRONIA FRUTESCENS.

CH. foliis lanceolatis tomentosis, caule fruticoso.

Chironia *frutescens. Linn. Syst. Vegetab.* xiv. *p.* 229. *per Gmelin. p.* 392. *Spec. Plant. p.* 273. *per Willden. p.* 1070. *Thunb. Prodrom. Plant. Cap. p.* 35.

Crescit in oris maritimis Promontorii Bonæ Spei Africes, in littore infra Leuwekopp, in montibus Hottentots Holland et alibi vulgaris.

Floret ab Augusto in Decembris usque mensem.

Radix perennis.

Caulis fruticosus, totus cinereo-tomentosus, erectus, subangulatus, ramosus, pedalis et ultra.

Rami lignosi, obsolete tetragoni, alterni, foliis deciduis annulati, ramulosi.

Ramuli superne aggregati, fastigiati.

Folia decussatim opposita, sessilia, lanceolata, obtusa cum acumine, integerrima, carnosa, frequentissima, erecta, subtomentosa, pollicaria vel paulo longiora.

Flores

Flores in ramulis terminales, solitarii, magni.

Perianthium inflatum, apice connivens, subtomentosum, semiquinquefidum: *laciniæ* oblongæ, concavæ, acutæ.

Corolla monopetala, tubulosa.

Tubus cylindricus, ampliatus, albus, rugosus, longitudine calycis, unguicularis.

Limbus campanulato-patens, quinquepartitus: *laciniæ* ovatæ, obtusæ cum acumine, membranaceæ, purpureæ, pollicares.

Filamenta quinque, tubo infra faucem inserta, linearia, erecta, alba, limbo triplo breviora.

Antheræ oblongæ, spirales, flavæ.

Germen superum, acutum, glabrum.

Stylus filiformis, albus, utrinque sulco longitudinali notatus, longitudine staminum.

Stigma simplex, obtusum, didymum, incurvatum, villosum, album.

Capsula oblonga, acuta, compressa, didyma, glabra, bivalvis.

Receptaculum in fundo calycis, sertiforme, basin capsulæ cingens, crenulatum, pallidum.

CHIRONIA JASMINOIDES.

CH. foliis lanceolatis glabris, caule herbaceo cernuo.

Chironia *jasminoides*. *Linn. Syst. Vegetab.* xiv. *p.* 229. *per Gmelin. p.* 391. *Spec. Plant. p.* 272. *per Willd. p.* 1066. *Thunb. Prod. Plant. Capens. p.* 35.

Crescit in regionibus Swellendam et alibi.

Floret Octobri.

Caulis herbaceus, totus glaber, tetragonus, parum ramosus, curvato-erectus, apice cernuus, pedalis et ultra.

Rami pauci, alterni, divaricato-patentes, simplices, cauli similes.

Folia opposita, sessilia, lanceolata, apice marginibusque reflexis, utrinque glabra, integra, patentia, internodiis duplo breviora, vix pollicaria.

Flores in ramis terminales, solitarii, purpurei.
Pedunculi e ramis continuati, hexagoni, parum incrassati.
Calyx angulatus, laciniis ovatis, acutis, erectus.

CHIRONIA LYCHNOIDES.

Ch. foliis lineari-lanceolatis glabris, caule herbaceo, ramis patulis.

Chironia *lychnoides*. *Linn. Syst. Vegetab.* xiv. *p.* 229. *per Gmelin. p.* 391. *Mantiss. p.* 207. *Thunb. Prod. Pl. Capens. p.* 35.

Crescit in summitate montis Hottentots Holland.

Floret Decembri.

Caulis herbaceus, uti tota planta glaber, subtetragonus, flexuoso-erectus, laxus, spithamæus.

Rami alterni, simplices, remoti, pauci, patentes, vel cernui, cauli similes.

Folia opposita, sessilia, lineari-lanceolata, utrinque attenuata, integra, patentia, pollicaria.

Flores in ramis terminales, solitarii, purpurei.

Calycis laciniæ ovatæ, acutæ.

CHIRONIA LINOIDES.

Ch. foliis linearibus glabris, caule herbaceo, ramis fastigiatis.

Chironia *linoides*. *Linn. Syst. Vegetab.* xiv. *p.* 229. *per Gmelin. p.* 391. *Spec. Plant. p.* 272. *Thunb. Prod. Plant. Capens. p.* 35.

Crescit in regionibus graminosis trans Swellendam.

Floret Octobri, Novembri.

Radix filiformis, fibrosa.

Caulis herbaceus, uti tota planta glaber, brevis, mox a radice ramosus, erectus, palmaris.

Rami ab inferiore parte plantæ elongati, frequentes, dichotomi, filiformes ramis capillaribus, parum angulati, erecti, subfastigiati.

Folia

Folia opposita, sessilia, lineari-subulata, integra, erecta, inferiora subpollicaria, superiora unguicularia.

Flores in ramulis terminales, solitarii, purpurei.

Calycis laciniæ lanceolatæ, corolla duplo breviores.

Valde affinis *Chironiæ lychnoidi*, cujus forsan sola varietas.

CHIRONIA BACCIFERA.

Ch. foliis lineari-lanceolatis glabris, caule fruticoso ramosissimo, fructu baccato.

Chironia *baccifera*. *Linn. Syst. Vegetab.* xiv. *p.* 229. *per Gmelin. p.* 392. *Spec. Plant. p.* 273. *per Willden. p.* 1070. *Thunb. Prod. Pl. Cap. p.* 35.

Crescit in collibus prope urbem, extra in campis, alibi vulgaris.

Floret Augusto et sequentibus mensibus.

Caulis fruticosus, totus glaber, subtetragonus, erectus, ramulosus, bipedalis et ultra.

Rami et *Ramuli* alterni, hexagoni, virentes, divaricato-patuli, virgati.

Folia opposita, sessilia, decurrentia, lineari-lanceolata, supra convexiuscula sulco longitudinali, subtus concaviuscula, marginibus reflexis costaque elevata, integra, glabra, decussata, patentia, internodiis longiora, pollicaria.

Flores in ultimis ramulis terminales, solitarii, flavi.

Perianthium monophyllum, ad basin fere 5-partitum, persistens, glabrum: *laciniæ* ovatæ, acutæ, supra convexæ, subtus linea carinatæ, virides, vix lineam longæ.

Germen inferum *Stylo* simplici filiformi *Stigmateque* obtuso.

Bacca globosa, glabra, carnosa, sanguinea.

Semina plurima, compressiuscula, subglobosa, punctato-rugosa, atra.

XV. *Remarks*

XV. *Remarks on the Generic Characters of Mosses, and particularly of the Genus Mnium.*

By James Edward Smith, M.D. F.R.S. P.L.S.

Read November 15, 1803.

Among all the different botanical opinions concerning the genera of Mosses, to which the discoveries of the great Hedwig have given birth, nothing has been more variously characterized, nor less accurately defined, than the old genus of *Mnium*, first established by Dillenius. The wanderings of the human mind in pursuit of truth are amusing and instructive, let the subject of its speculations be what it will; in natural science especially they always lead to good. That wisdom so conspicuous to the most careless observer of creation at large, condescends to display itself with more effect and precision in proportion to the ardour and accuracy of our inquiries; and the humblest moss affords no less instruction to the philosophical student of order, than satisfaction to the pious mind. Our time therefore may not be ill bestowed in examining, first, the principles upon which Dillenius founded this genus, and then in considering how those principles, with other new ones discovered since, have led his successors widely astray in various directions, till we shall find the judgment of Dillenius confirmed, though upon principles to which he was a stranger.

This accurate observer of Mosses gives, as the character of his *Mnium*,

Mnium, that it bears two different kinds of heads, or fructification; the one powdery and naked, that is, destitute of calyx and capsule; the other of the same capsular nature as in *Bryum* and *Hypnum*, those great genera which, in the work of Dillenius, swallow up almost all the rest of this natural order. He considers this character as abundantly sufficient to distinguish *Mnium* from all other mosses, and proceeds to inquire into the nature of these different parts of fructification. He presumes the capsules to be, as he believed of other mosses, *antheræ*, and the powdery heads to produce seeds, or at least what is analogous to them. We now know that he mistook the male for the female, and *vice versa*; though his having called the supposed *antheræ* by the name of *capsulæ* has concealed his mistake from common observation, and thrown all the glare of his error on Linnæus, who adopting his hypothesis, at the same time corrected, as he thought, his phraseology. We now resume the language though we discard the ideas of Dillenius, calling his and Linnæus's supposed *antheræ* by their proper name of *capsulæ*. Nor, while we profit of the brilliant physiological and botanical discoveries of Micheli and Hedwig, do we find any reason to follow the former in his careless denomination of the part in question, which he calls *capitulum*, nor to adopt the new word invented by the latter, without any reason or advantage, *sporangium*.

Dillenius describes eight supposed species of *Mnium*; for he has referred to this genus every thing in which he found a powdery head, even though he did not meet with the capsule. This has led him into a great error. In his first, second, third, fourth and eighth species he is indeed, as far as any one could at that time be, correct; but his remaining species are not even mosses at all. The fifth and sixth are *Jungermanniæ*, a mistake which Linnæus did not correct; and the seventh is, as the careful Micheli had already

already made it, a most distinct genus of *Algæ*, the *Blasia pusilla* of himself and Linnæus.

Linnæus, in just conformity to the principle he had adopted, referred to *Mnium* every moss with a terminal fruit-stalk, in which the powdery head or star of male flowers, supposed by him female, had been found; but this tended in no small degree to perplex his followers. Some of them indeed, chiefly intent on compiling catalogues, and having an implicit confidence in their master, never disputed the genus of any plant which he had fixed. The homage of such pupils, however, could not conduce much to his honour; for such imperfect observers could be no adequate judges of his merit. His own talents were formed in the school of severe investigation and accurate discrimination, and those only can appreciate them who have been trained under the same wholesome discipline. These powdery heads or stars were found to exist, in some shape or other, in many supposed species of *Bryum* when carefully examined; and at length the Hedwigian discoveries have, beyond a doubt, demonstrated them to be the male flowers,—consequently essential to every moss. For some years therefore, during the progress of these discoveries, botanists were at perpetual variance concerning the genera of many common mosses, which were by some writers referred to *Bryum*, by others to *Mnium*, according as the male flower was observed or not. It is but justice to the author of the *Flora Anglica* to remark, that, even in his first edition, he steered clear of this difficulty, by referring to *Mnium* such only as have a *naked* head of male flowers; by which, except the original Dillenian blunder respecting 2 or 3 *Jungermanniæ*, he has pretty nearly preserved the natural genus entire. Lightfoot on the other hand, in his *Flora Scotica*, has indolently followed Linnæus. Withering, so careful and attentive in some departments of the *Cryptogamia*, has in this

most

most unaccountably failed. It is difficult to understand his definitions of the two generic characters, and next to impossible to divine by what rule he distributed the species under each.

From the Hedwigian school, which had thrown so much light on the generic characters of mosses in general, and which had done the most essential service in removing from *Mnium* and *Bryum* those vast and discordant tribes in which the *peristomium* is simple, every thing was to be expected upon the point in question. For my own part, after having contemplated with rapturous admiration the physiological discoveries of the illustrious Hedwig, and yielded that implicit assent to his assertions and deductions, which his clear and candid manner commands, I turned with eagerness to the methodical part of his works. My primary object was to learn to distinguish with certainty the genera of *Hypnum*, *Bryum* and *Mnium*, about which botanists had ever been in dispute. But here I was disappointed. In his distribution of the mosses with a single *peristomium* all is lucid order, so far at least as his principles are admissible. In the arrangement of those which have an inner *peristomium*, he appears to me to run into refinements which neither lead to the knowledge of natural genera, nor can easily be followed up by common observers. I found with some concern that we must rely on the old mode of distinguishing *Hypnum*, by its lateral fruit-stalk, from *Bryum*, the difficulties attending which are however happily removed by the separation of the single-fringed mosses from the latter: I found moreover that *Mnium* remained at least as unintelligible as before. Indeed Hedwig has rather confused it by reversing the original characters. His *Bryum* has a round or capitate male flower; his *Mnium* a flat or discoid one. His most able followers, Schreber, Swartz and Roth, well aware of the insufficiency of such distinctions, united the two genera into one,

 while

while Hoffman made a bold but unsuccessful attempt to cut the gordian knot, by calling almost every thing with a single *peristomium Bryum*, and with a double one *Mnium*.

In solving this and every other botanical difficulty of the kind, the surest guide is that golden rule of Linnæus, "*Genus dabit characterem, non character genus.*" By this touch-stone let us presume to try the genera of Hedwig, but with all the deference due to so great a master. If my corrections should prove just, truth may be benefited, but his immortal fame cannot be impaired. No one would be more eager than myself to defend it, if necessary, against any carping censors.

The great hinges on which his method turns are the double, the single, and the defective *peristomium*, and the terminal or lateral situations of the male and female flowers. Of these the three first have the felicity, rare in botanical characters, of being absolute, and leading, with almost mathematical precision, to natural genera. *Orthotrichum* only affords some exceptions. Of some of the Hedwigian subdivisions of these, different opinions may be formed, though there can be but one sentiment concerning the great outline. For instance, the comparative number of teeth, in the simple *peristomium*, 4, 8, 16, 32 or 64, affords most solid generic distinctions, and I regret that, in forming his genus of *Didymodon*, he makes number subservient to a trivial and very obscure circumstance, the approximation of the teeth in pairs. I scruple not to refer his *Didymodon homomallum*, in the description of which he omits to notice that it has but 16 teeth, to *Grimmia*, and the other species to *Trichostomum*. So all the species of *Cynontodium*, a genus distinguished from *Didymodon* by the flowers being hermaphrodite only, may be very commodiously referred either to *Grimmia* or *Trichostomum*, according as the teeth are 16 or 32. And here I beg leave to observe, that this circumstance of

of hermaphrodite flowers appears to my judgment the least solid of all the Hedwigian distinctions, and leading in no case to a natural, still less a commodious, generic character. With *Cynontodium* therefore I scruple not to abolish *Webera* and *Pohlia*; nor should I retain *Bartramia*, but for its peculiar habit, and an easy essential character to be mentioned hereafter. But while I thus venture to prune this ingenious system, let me indulge in the applause it deserves for the excellent marks it affords in *Tetraphis*, *Dicranum*, *Tortula*, *Polytrichum* and *Fontinalis*, which alone are enough to ensure its permanency as long as the study of botany endures.

We come now to the investigation of what makes but too conspicuous a figure in this admirable system, the situation of the male and female flowers. I mean not to object to the characters deduced from the latter. Experience shows that the female flowers being lateral or terminal is of primary if not infallible importance in this tribe. The most natural genera of *Bryum* and *Hypnum*, and the no less natural *Pterogonium*, cannot be defined by any other means. In these cases, "*genus dat characterem.*" What I regret is, that Hedwig, carrying this principle through with the male flowers also, has made the *character give the genus*, and in every case, but perhaps one, erroneously. Thus *Fissidens* is separated from *Dicranum*, and *Weissia* from *Grimmia*, with some reason indeed, as to habit, in some species of each, but not in all*; and *Barbula* is divided from *Tortula* against every natural principle. It becomes me however to mention the one case in which I have been almost tempted to admit the character of the male flower being axillary instead of terminal to mark a genus, which is in *Gymnostomum*. The habit of *Anictangium*, the original *Hedwigia*, is so distinct from the other naked-mouthed

* In some species of *Fissidens* the female flower indeed is lateral.

 mosses,

mosses, as almost to authorize a separation*; and I am inclined to regret that this greatest name in mosses has been removed to a distant tribe of plants, with which it has no peculiar associability.

Let me now draw this subject to a conclusion by suggesting a mark, which, I presume, may serve to distinguish some genera in which the Hedwigian characters are least satisfactory, I mean *the capsule being longitudinally furrowed.* I have long ago indicated this character in *English Botany*, under *Bartramia*, but have not till lately adverted to it in *Mnium;* I am however persuaded that it is equally certain in both. It is chiefly seen in the ripe fruit, and the number of furrows is 16, answerable to the teeth of the outer fringe. It keeps the real *Mnia* of Dillenius together, except the first, which is the *Tetraphis pellucida*, and it associates with them most naturally the *Arrhenopterum* of Hedwig. Having examined every *Bryum* which has come in my way, I can aver that a smooth capsule is essential to that genus. The same may almost be said of *Hypnum;* for I know no described species with a furrowed capsule except the *undulatum*, and perhaps the *ornithopodioides.* I have indeed lately received a number of exotic mosses with furrowed capsules from my worthy friend Mr. Menzies. These will probably come under *Mnium;* but it requires more time than I can just now bestow to examine accurately the terminal or lateral origin of all their fruit-stalks. I am ready to allow that this character of the furrowed capsule, which appears so sufficient to characterize a genus, already indicated by its habit, in double-fringed mosses, is, in those with a single fringe, of no further importance than to distinguish species. Who does not know that the most essential principles of generic distinction, the germen inferior or superior for instance, are sometimes of no validity at all?

* Mr. D. Turner has just suggested to me that the *female* flowers in several *Anictangia* are lateral; which is a sufficient mark.

Witness

Witness the most natural genus of *Saxifraga*. On the other hand, what slight marks are we glad to seize, in the grasses and umbelliferous plants, to mark genera which habit shows to be distinct!

As the *furrowed sphærical capsule* of *Bartramia* therefore with ease reduces to that genus the *Mnium chrysocomum* of Dickson, as well as the *fontanum* and *marchicum* of Hedwig, which Nature indicates as belonging to it, and possibly his *sphærocarpon* also, though I have not seen the latter; so the *furrowed cylindrical capsule* of *Mnium* will, unless I am greatly mistaken, bring together species closely allied to each other, and on many accounts unlike other mosses. If the cylindrical or sphærical capsule be thought too slight a distinction, these two genera must be united under *Mnium*, that being the oldest name; but I should with difficulty assent to such an union.

I shall conclude with the generic character of *Mnium* at length, and an enumeration of all the species that I have been able to determine with certainty.

MNIUM.

Capsula cylindracea, mox sulcata. *Peristomium exterius* dentibus sedecim, basi dilatatis: *interius* membranaceum, laciniatum. *Calyptra* lævis. *Pedicellus* terminalis.

1. Mnium *androgynum*, monoicum, capsulâ rectâ operculo conico, foliis undique imbricato-patulis apice denticulatis.
   M. androgynum. *Linn.*
   Dill. t. 31. *f.* 1.
   Habitat in Europâ.

2. Mnium *conoideum*, monoicum? capsulâ obovatâ rectâ, operculo subulato, foliis undique imbricato-patulis integerrimis.
   M. conoideum. *Engl. Bot. t.* 1239.

Bryum

Bryum conoideum. *Dicks. Crypt. fasc.* 4. 9. *t.* 11. *f.* 2.
Habitat in Scotiâ et Hiberniâ.

3. Mnium *palustre*, dioicum, capsulâ obliquâ, foliis acutis: superioribus arcuato-secundis, caule erecto dichotomo.
M. palustre. *Linn.*
Dill. t. 31. *f.* 3.
β. *Dill. t.* 31. *f.* 4.
Habitat in palustribus Europæ.

4. Mnium *reclinatum*, dioicum, capsulâ erectiusculâ, operculo conico, foliis obtusiusculis subsecundis, caule decumbente ramosissimo.
M. ramis brevibus, inordinate progredientibus. *Dill. Musc.* 239. *t.* 31. *f.* 8. *Herb. Dill.*
In Virginiæ paludosis legit J. Mitchell. *Dill.*
Color et facies præcedentis, sed magnitudo totius plantæ duplò minor. Capsula gracilis, ferè erecta. Caulis ramosissimus, decumbens, nec dichotomus, erectus. Flores dioici, omnes terminales; masculi pedicellati, nudi, ut in *M. androgyno*, et *M. palustri* β.

5. Mnium *pendulum*, capsulâ pendulâ, operculo planiusculo, foliis subulatis striatis recurvis, caule erecto.
In Novâ Zeelandiâ legit D. Menzies.
Caules determinatè ramosi, foliosi, ferrugineo-tomentosi. Folia lutescentia, undique imbricata, subulata, uninervia, striata, recurvato-subsecunda. Pedicelli solitarii, erecti, biunciales, rubri. Capsula recurvato-pendula, campanulato-cylindracea, castanea. Operculum planiusculum, umbonatum.

6. Mnium *arrhenopterum*, capsulâ inclinatâ, operculo subulato, foliis ellipticis obtusis, caule erecto.

Arrhe-

Arrhenopterum heterostichum. *Hedw. Sp. Musc.* 198. *t.* 46. *f.* 1—9.

Bryum heteropterum pellucidum. *Dill. Musc.* 352. *t.* 45. *f.* 11. minus benè. *Herb. Dill.*

B. foliis membranaceis obtusis. *Dill. Musc.* 552. *t.* 35. *f.* 19. meliùs. *Herb. Dill.*

B. caule erecto ramoso, foliis ovatis undique imbricatis. *Linn. Fl. Lapp. ed.* 1. 317. *Herb. Linn.*

Hypnum illecebrum. *Linn. Fl. Lapp. ed.* 2. 329. *Sp. Pl.* 1594, excluso syn. Dill.

Habitat in Virginiâ, Pensylvaniâ, etiam Lapponiâ.

I am obliged to Mr. Dawson Turner for the very interesting discovery of this being the same with the Lapland plant which Linnæus called *Hypnum illecebrum.* I had often examined the original specimen without any success; for, though it evidently appeared to be nothing known in Europe, I had not then seen the *Arrhenopterum.* I retain this generic name as an adjective for the specific denomination. Its only pretensions to be a genus consisted in the male flowers being axillary: and it furnishes an additional proof of how little importance that circumstance is in nature; for every thing clearly evinces the affinity of this moss to the original *Mnium.* The *Hypnum* n. 46. of Dillenius may therefore now retain the name of *illecebrum*, which was adopted from his definition of it in his work.

XVI. *Ob-*

XVI. *Observations on the Zizania aquatica. By Aylmer Bourke Lambert, Esq. F.R.S. V.P.L.S.*

Read December 6, 1803.

ZIZANIA AQUATICA.

ZIZANIA paniculâ infernè racemosâ supernè spicatâ.

TAB. XIII.

Z. aquatica. *Linn. Sp. Plant.* 1408.
Z. palustris. *Linn. Mant.* 2. 295.
Z. palustris. *Schreb. Gram. p.* 54. *tab.* 29.

The seed of *Zizania aquatica* in a vegetating state from America was long a *desideratum* among the botanists of this country; for although seeds were received here at different times, yet none of them grew. At last Dr. Nooth, by the desire of Sir Joseph Banks, sent them from the lakes of Canada, put up in jars of water. As soon as they arrived they were sown in a proper situation, where they came up in a few days, and the plants ripened their seeds extremely well in the autumn. In a pond at Spring-Grove Sir Joseph Banks has a great quantity of this plant, growing annually, ripening its seeds, and sowing itself round the edges; and I am persuaded that it might be sown with some advantage where no other grain will grow, in many shallow pieces of water in Great Britain and Ireland, especially in the latter country, where I have seen several extensive lakes which appear well suited for the purpose. It grows in great abundance in the lakes of Canada;

Ferd.d Bauer del. Zizania aquatica Jas. Basire fc.

Canada; and the seeds, which are as large as oats, and perhaps as nutritive, are used by the Indians for food; as may be seen in *Carver's Travels in America*, and also in *Kalm's Travels*, vol. 3. p. 32 and 54.

This species has been so fully described already by Linnæus in his *Mantissa*, that any further description would be superfluous: but as the figures which have been hitherto given of it are very imperfect, I beg leave to present the Society with a plate engraved from a drawing made from a plant growing at Spring-Grove.

Dr. Smith, on the authority of the Linnæan Herbarium, informs me that this is certainly what Linnæus meant by *Zizania palustris* in his *Mantissa*, although it is what he had previously described in both editions of his *Species Plantarum* under the name of *Z. aquatica*, as the original specimen shows. It seems however that he latterly intended Sloane's plant, *Hist. of Jamaica, tab.* 67. to remain as the *aquatica*, conceiving that, on account of its great spreading panicle, to be a different plant. Linnæus notes in his manuscript that *Z. terrestris* of *Hort. Malab. v.* 12. *t.* 60. should be examined, in order to be distinguished from this in the specific character. He further remarks, that the above plant, *Zizania palustris*, which he had in his garden, was well figured in a dissertation *de Alimentis farinaceis*, published at Leyden in 1760 by J. Scheuchzer. Probably Browne's synonym belongs rather to Sloane's plant.

Fig. A. in the annexed plate represents a male Glume, with the Anthers magnified.

B. An Anther highly magnified.

C. Female Glume, natural size.

d. The other side of the same.

D. The same highly magnified.

E. The same opened, showing the Pistillum.

F. Pistillum, with the Germ, Styles, and Nectary.

G. Seeds, natural size. H. Seed dissected.

 XVII. *Ob-*

XVII. *Observations on the Durion, Durio zibethinus of Linnæus.*

By Mr. Charles König, F.L.S.

Read December 6, 1803.

THE vegetable genus which constitutes the object of this Paper, and of which I had an opportunity of examining the flowers, fruit, and a small branch, through the kindness of the Rt. Hon. Sir Joseph Banks, to whom they were sent from Amboyna by Mr. Christopher Smith, F. L. S. ranks high in the number of those which have a just claim to re-examination; for the characters hitherto attributed to it are vague and erroneous. Linnæus, who first introduced the *Durio* as a genus in the thirteenth edition of his *Systema Plantarum*, had not seen any part of the plant; he therefore took the generic character from Rumpf's *Herbarium Amboinense*: a work very useful, upon the whole, for ascertaining the general habit and the history of the vegetables of which it treats, but scarcely in any instance sufficient, either by its delineations or descriptions, to convey an adequate idea of the parts of a plant, or to be depended on for establishing generic characters. The fact is, that Rumpf's figure of the flowers of the *Durion* does not even express their habit; nor can any knowledge be derived from his description, which, as may be naturally expected, bears testimony of the period in which it was composed. But the Latin translation which is added to this work misleads still more than the Dutch original. It is, I suppose, from consulting this translation that Linnæus describes the ovarium of the *Durion* as stipitate, which is contrary to what I have observed; nor,

nor, indeed, is it described as such in the original*. It was this mistaken notion which, probably, induced Jussieu (whose very errors respecting the natural arrangement of plants are often indicative of much discernment) to class the plant in question with the *Capparides*. That it does not, however, belong to this order, but must be transferred to that of the *Malvaceæ*, in the proximity of Bombax, Adansonia, or Carolinea, will, perhaps, appear from the following description:

DURIO zibethinus.

Calyx *duplex:* uterque inferus, monophyllus, subcoriaceus, intus glaber, extus nitidis squamis argenteus: squamæ minutissimæ, patellatæ, radiatæ, margine erosæ, pellucidæ, centro puncto nigro notatæ.

Exterior latus, fundo pro excipiendo interiore excavatus, bilobus: lobi lineas novem ad pollicem longi, concavi, obtusi, patentes.

Interior pollicaris, urceolatus, medio ventricosus, obsolete quinquesulcatus, basi attenuatus, fundo maculis quinque prominulis (nectariis?) notatus, ore dentatus: dentes quinque, recti, acuti.

Corolla: *Petala* quinque, fundo calycis inserta, bipollicaria, squalide alba, unguiculata. *Laminæ* ovato-lanceolatæ, patenti-reflexæ, integerrimæ, sensim abeuntes in *Ungues* breviores, crassiusculos, longitudinaliter sulcatos.

* The following is a translation of Rumpf's own words:—"Exactly in the middle (of the flower) there is a long style, with a yellow head (*stigma*), situate (*the style*, but not the stigma) on an oblong, granulous knob (*germen*), which becomes the fruit;" which the Latin translator has given thus:—"In horum centro longus continetur stylus, qui luteum gerit capitulum, quod oblongo insidet granuloso pistillo, quod abit in fructum."

Stamina: *Filamenta* plurima (25—45), filiformia, rubra, erecta, petalis paululum longiora (ante efflorescentiam multum breviora), subdichotoma, connata infra medium in phalanges quinque petalis oppositas, fundoque calycis insertas. *Antheræ* rotundatæ, mesenteriformes: lamellæ curvatæ, subpedicellatæ, rubræ, marginibus albis.

Pistillum: *Ovarium* superum, ovato-oblongum, obsolete pentagonum, primo squamulis argenteis postea granulis undique obsitum, neutiquam stipitatum. *Stylus* simplex, longitudine et colore filamentorum, teres, filiformis, basi crassior, superne subintortus. *Stigma* capitatum, quinquesulcatum, flavens.

Fructus: *Pomum* maximum, ovato-rotundatum s. rotundum, in vertice umbonatum, quinqueloculare, corticatum: Cortex crassus, duriusculus, undique obsitus tuberculis 5--hexaëdris, pyramidatis, suberosis, innocue mucronatis, fibrosis, flavo-virescentibus, medio fructus pollicaribus, versus extremitates minoribus, ad pedunculum crassum in squamas conicas abeuntibus. *Caro* solida, fibris rubentibus intertexta. *Loculamenta* quinque, longitudine fere fructus, extrorsum dehiscentia, undique lævigata excepto latere pistillari* cum quo semina, mediantibus arillis, arcte connata sunt.

Semina in singulo loculamento 2—5, nitida, spadiceo-lutea, ovato-oblonga, hinc convexa inde planiuscula, ab altero latere versus basin derasa, arillata.

* An excellent carpologist, Dr. Corrêa de Serra (*Linn. Trans. vol.* 5. . *p.* 222), calls *chorda pistillaris* that aggregation of longitudinal fibres and vessels, which in most fleshy fruits may be traced from their insertion in the receptacle up to the stigma, and to which the seeds are affixed. This bundle is less obvious in the fruit of the *Durion*, the whole of its flesh being interwoven with fibres; but still it exists: whence I apply the term of *latus pistillare* to the side of the loculaments next to the centre of the fruit.

Arilli

Arilli horizontaliter aut oblique incumbentes loculamento conformes, irregulares: medii majores, supremus infimusque attenuati; omnes sublobati, crassi, carnoso-mucosi, tenerrimi, albi, ad mutuum contactum oblique truncati, latere interno cum centro fructus pistillari arctissime connati, ceterum liberi, membrana tenuissima pellucida separatim obducti.

Testa ex duabus paginis conferruminatis conflata: pagina exteriore solida, duriore; interiore suberosa, subcellulosa: cellulis fluidum fuscum coercentibus.

Perisperma nullum.

Embryo dicotyledoneus, testæ cavitatem explens, rectus.

Cotyledones amygdalino-carnosæ, ovato-oblongæ, parte superiore conferruminatæ, inferiore liberæ, incisæ.

Radicula intra extremitates cotyledonum liberas latens, inverse subpyramidalis, obsolete tetragona.

Obs. 1. Though this description does not in every point exactly answer the characteristic of the order of the *Malvaceæ*, as it now stands; yet it cannot be denied that many characters which I have pointed out, such as the double calyx, the connected stamens, the conglomerated anthers (which we observe exactly similar in several other Malvaceous plants, for instance, in *Bombax pentandrum*), nay even the fruit itself, so anomalous at first sight, strongly indicate at least the neighbourhood in which the *Durion* is to be placed in natural arrangement. The place assigned to it by Jussieu is warranted by the idea which this naturalist entertained of the germen being stipitate, and by the scales on the under surface of its leaves, which very much resemble those that cover the surface of the leaves of several *Capparides*; but the first character, as I have shown, is erroneous, and the other is of less importance, and only indicative of the affinity subsisting between both families.

Obs. 2.

Obs. 2. I have described the fruit as containing five loculaments outwardly dehiscent at the period of maturity; and this is all I ventured to say, from what I was able to observe in the specimens of the fruit preserved in spirits. In these I could distinguish, at equal distances, the lines where the fruit was to gape, and which divided each of the loculaments into two equal parts. This naturally suggested to me the idea of a *Capsula baccata*, with valves, two of which conjoinedly form each of the loculaments (*valvulæ medio septiferæ*); a conformation proper to the fruit of a great number of *Malvaceæ*. Finding, however, that the septa which separate the loculaments were too intimately connected with the central or pistillar part of the fruit, and without any appearance of division, it seemed more probable to me that no separation took place in the centre; and hence I made use of the more ambiguous term *Pomum*, which also, according to the sense in which it is taken by our great master in carpology, the late Dr. Gærtner, holds in many cases a midway between capsule and berry. From Rumpf's account, which corresponds with my supposition, we learn, that in order to try whether a *Durion*-fruit be fit for eating, the amateurs usually tread upon it with the foot: if ripe, it gives way in five places by as many natural fissures, which exhibit five loculaments.

Obs. 3. The fleshy delicate substance which fills the loculaments of this fruit, and contains, within separate lobes, the seeds, I have denoted in the description by the term of *aril*; which may, perhaps, appear objectionable on account of the unusual form and size of these parts: but they accord pretty well with the notion which we have of an *aril*; for each of these lobes is an accessory integument of a seed, with which it is grown together only at its umbilical part. Our physiological insight into the nature and economy of many of the parts surrounding the seeds is still too

limited

limited to keep them all distinct by adequate definitions; and this is also the case with what is termed the *aril* of the seed. But sometimes this term is applied to parts which obviously have no claim to it: thus, for instance, what Gærtner gives as an instance of *Arillus baccatus* in the Litchi (*Scytalia chinensis G.*) is nothing else but the pulp of this delicious fruit, which the same author improperly calls a *Bacca exsucca*: this pulp, when the fruit becomes dried, separates from the hard outward skin in all points, except at the base, and, concentrating round the kernel, exhibits the shape in which it is represented in the incomparable work of Gærtner.

The only species of the genus *Durio* is that highest of all fruit-trees, known by the names of *Durion* and *Dureyn*. It is not found in the western parts of India, but begins in Malacca, and is continued on through Java, Madura, Borneo, the Celebes, and all the Moluccas. Rumpf and other ocular witnesses describe its thin and spreading head as supported by an angular and as it were winged stem, covered with an even and greyish yellow bark, which distinguishes this tree among all others. The leaves are alternate, from four to five inches in length, oblong, acuminate, entire, rather plaited at the base, above smooth and of a deep green hue; below covered with minute rust-coloured scales, and marked by a strongly elevated longitudinal rib, emitting distinct and arcuate lateral branches. Their stalks are an inch long, fleshy, swoln, and likewise covered with minute scales. No stipules were observable in those small branches which fell under my examination, but it appeared as if there were some traces of their former existence. The inflorescence of the *Durion* is such as we see in all trees bearing heavy fruit, as in the Jack, Bread-fruit

fruit tree, &c.: the flowers are situate on the thicker branches, in bunches supported by a common stalk; the partial stalks are 2—3 inches long, roundish, covered like the calyx with minute scales, and inserted in the common peduncle by means of a joint.

There are several varieties of the *Durion* specified by Rumpf, only differing from each other by the shape and size of the fruit. The *Durion* is represented by those who were in the habit of eating it, as the most delicious of all the fruits of India. The eatable part of it is that aril-like substance which contains the kernels, and which most resembles cream or the blanc-manger of our tables; but a considerable drawback from the extreme gratification it procures to the palate of the epicurean is its intolerable stench: even the rinds emit such offensive effluvia, that at Amboyna, as Rumpf and Valentin state, it is forbidden by the law to throw them out near any public path. Some compare this smell to that of putrid animal substances, others to that of rotten onions; but all agree that, if the first repugnance is once overcome, no fruit is more enticing than the *Durion*. These qualities are so very well known, that I was surprised to find it mentioned in the *Histoire de Voyages*, and copied from thence by Lamarck in his *Encyclopédie*, that the fruit of the *Durion* diffuses an *excellent* odour, but that its taste is rather unpleasant, it being that of *fried* onions*. There are besides other errors in this description; for instance, that the fruit opens in four places, and so forth.

* "Il n'est bon à manger que lorsque l'écorce s'ouvre par le haut; le dedans, qui est alors parfaitement mûr, donne une odeur excellente.—L'habitude y fait trouver un goût exquis; mais ceux qui en mangent rarement ou pour la premiere fois, lui trouvent d'abord un goût d'oignon roti, qui ne leur paroît pas fort agréable."

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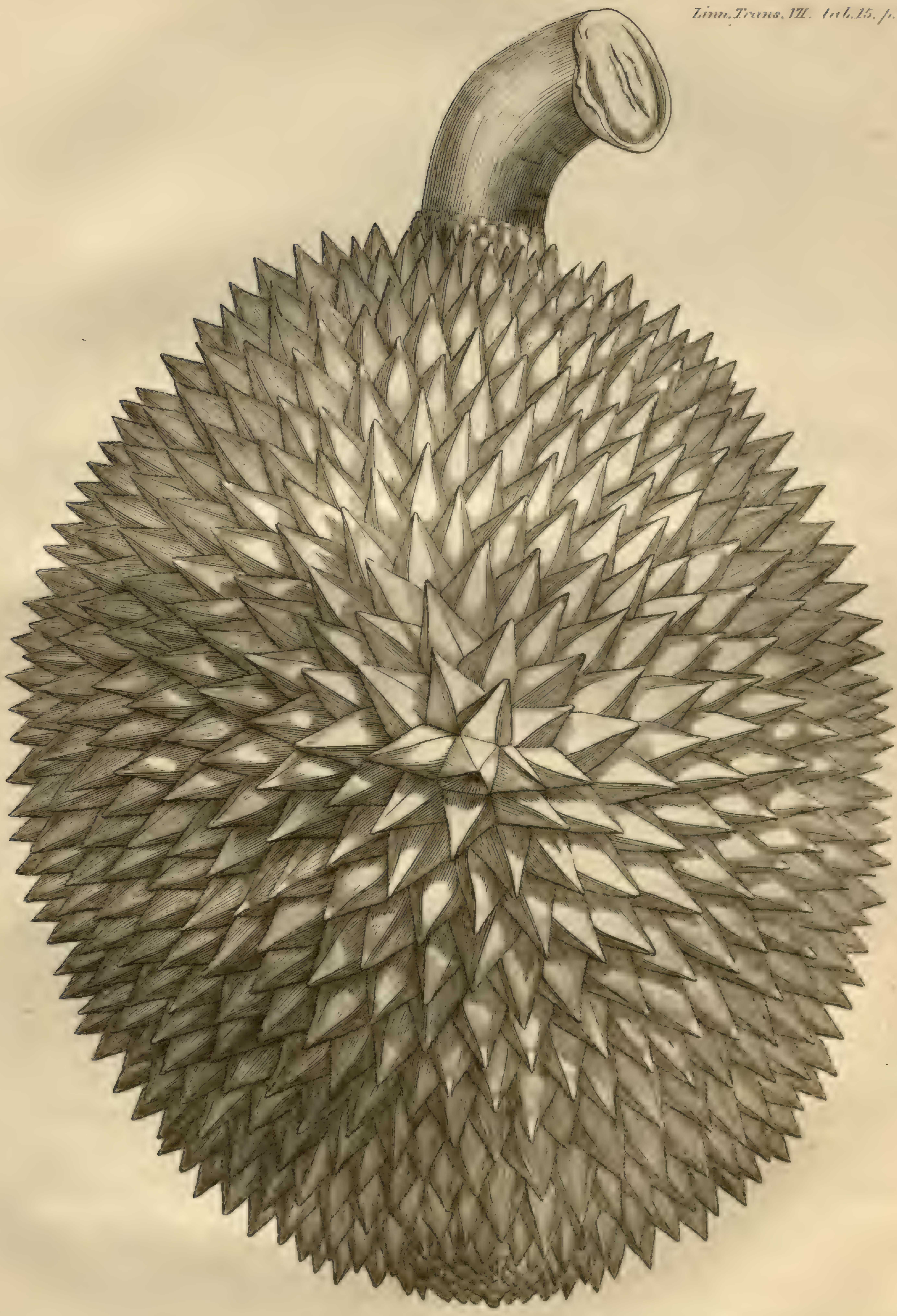

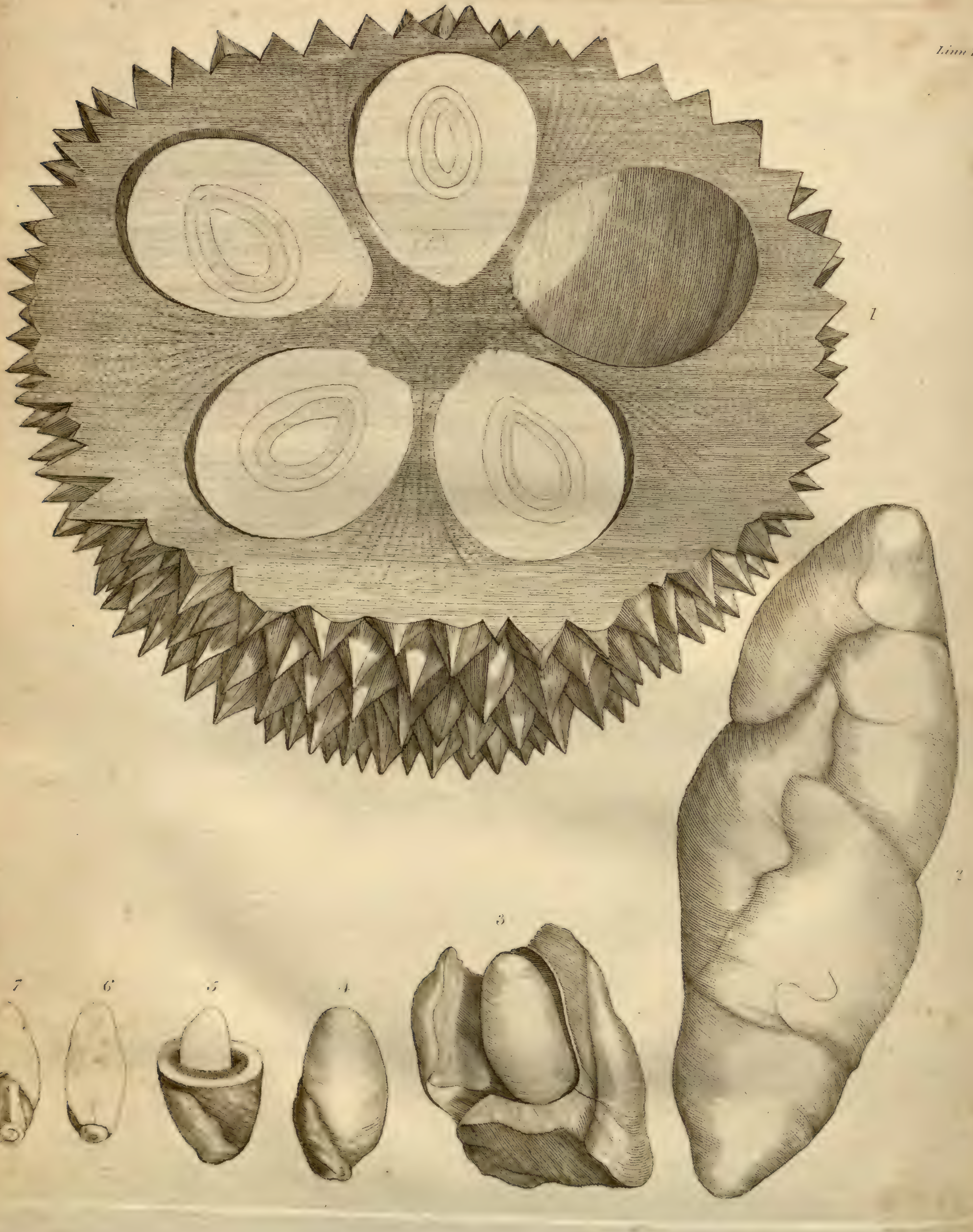
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EXPLANATION OF THE ANNEXED PLATES.

Tab. XIV. *Fig.* 1. A small branch of *Durio zibethinus.*
2. A complete flower of the same.
3. The outer calyx, separately.
4. The inner calyx.
5. A petal.
6. A phalanx of stamens.
7. An anther, magnified.
8. A lamella of the same.
9. The ovarium and style.
10. A piece of the scaly surface of the calyx and a scale magnified.

Tab. XV. A middle-sized *Durion.*

Tab. XVI. *Fig.* 1. A transversal section of the same.
2. The mass of arils or fleshy lobes enveloping the kernels, taken out of the loculament.
3. A single lobe of the same, opened to show the situation of the seed.
4. The seed, detached.
5. Transversal section of the same.
6. The embryo, entire.
7. The same, with a part of the conferruminated cotyledons cut off, to show the situation of the radicle.

 XVIII. *Ob-*

XVIII. *Observations on some Species of British Quadrupeds, Birds, and Fishes.* *By George Montagu, Esq. F.L.S.*

Read December 20, 1803.

To a society founded on so liberal a basis as the Linnean Society there needs no introduction to the miscellaneous writings of an individual, whose object can only be the diffusion of knowledge on partial subjects of natural history.

With this view I beg leave to lay before the Society the following observations on a few species of British birds whose history appears to be imperfectly known; together with a few additional remarks on two of our smallest quadrupeds; and a description of a beautiful fish, the *Cepola rubescens*, hitherto, I believe, not noticed on our coast; and of two other rare species.

Harvest Mouse.

Mus Messorius. *Shaw Zool.* ii. *p.* 62. *fig. vignette.*
Mus minutus. *Gmel. Syst. p.* 130. 8.?
Harvest Mouse. *Br. Zool.* i. *p.* 107.
Pennant Quadr. ii. *p.* 384.
White Selb. p. 33. 39.

This elegant little species of mouse, first noticed by Mr. White as inhabiting the corn-fields and ricks about Selborn, and, through his communication, first made public by Mr. Pennant as indigenous to England, is by no means confined to Hampshire; for we well remember it was common in the more champaign parts of Wiltshire in our younger days, and previous to the

discovery

discovery of it by Mr. White: and we have since those juvenile days found it in other parts of the same county, in Gloucestershire contiguous, and in the south of Devonshire.

Mr. White has very justly described its nest to be without any opening; but this is not peculiar to that of the Harvest-mouse, for we have observed most of the species of this genus close up the opening every time they leave their young. We have more than once found the nest of this mouse containing young; in one of which were five, sufficiently grown and covered with hair to distinguish them: this was placed above two feet from the ground among the branches of a dock, close to a hedge, early in the month of September. It must however be remarked, that the Wood-mouse of Shaw's Zoology sometimes makes its nest at a very considerable distance from the ground, having found it in the top branches of furze at least five feet high, and not uncommonly in woods: these are also destitute of any opening, even after they are deserted.

The Harvest-mouse appears to be a tender animal; as our attempts to keep it alive in confinement have hitherto been unsuccessful. Like other field-mice, it burrows in the ground, where it retires during the colder months; but we have seen some hundreds taken out of oat-ricks (their favourite abode), without any signs of torpidity at that season: in such a situation they appear to breed the greater part of the year.

Doctor Shaw has very justly remarked, in his description of the Minute-mouse, that it seems so nearly allied to this species as scarce to admit a specific distinction: indeed, if we consider the superior length of the fur in that mouse, a circumstance incident to a Siberian climate, as the only apparent distinction, there can be no reason why the synonyms of these mice should not be brought together.

WATER SHREW.

Sorex fodiens. *Gmel. Syst. p.* 113. 7. *Shaw Zool.* i. *p.* 534. *t.* 118.
Sorex bicolor. *Nat. Miscel. t.* 55.
Water Shrew. *Pennant Quadr. p.* 308. *No.* 236. *Br. Zool.* i. *p.* 125. *t.* 11. *No.* 33.

In addition to what has been said of this rare animal by the very respectable authors referred to, we beg leave to add, that it is an inhabitant of Devonshire, as Mr. N. Luscomb of Kingsbridge picked up a recently killed specimen in that neighbourhood, and which is now in our possession. This, which is a male, weighed three drams and a half: it differs a little from those generally described, as the throat and breast are pale ferruginous.

It was found about the time of the year that the annual mortality befalls the common Shrew, *Sorex araneus*; and, contrary to the usually supposed habits of which its name is indicative, was remote from water, upon one of the highest and most arid situations in the country, on a rocky bank. Whether it had been brought to that spot by an owl, or any other bird of prey, is not to be determined; but is not likely, as it had no marks of violence; nor is it usual for predaceous birds to carry their prey to so great a distance as this was found from a place suitable to a supposed amphibious animal: it is more probable that it sometimes rambles from its more usual haunts.

CIRL BUNTING.

Emberiza Cirlus. *Gmel. Syst. p.* 879. *Ind. Orn.* i. *p.* 401. 10.
Cirl Bunting. *Lath. Syn.* iii. *p.* 190.
Bunting, Cirl. *Orn. Diction.*

Since we made public the discovery of the Cirl as indigenous to the west of England, opportunity has thrown in our way the means

means of becoming more intimately acquainted with its manners and habits, which may possibly be as interesting to a few others as they were to us, and therefore we beg leave to add the following particulars to the natural history of that bird.

About the middle of July we discovered a nest (on an old stump of a tree upon a bank) not quite finished, which we suspected to belong to this bird; and on visiting it again on the 25th we found that it contained four eggs, which proved to be those of the bird in question; two of these were taken away, and in a few days two others were deposited*, which, with the other two before left, were suffered to remain, in order to become acquainted, as much as possible, with the natural history of this species.

On the 12th of August we revisited the nest, and found the young had been hatched some days, as they could see, and had thrown out some stubs in the wings; so that the time of incubation could not have been more than twelve or thirteen days.

On the 15th we took two young ones from the nest, with a view of rearing them by hand, and left the others as a reserve, in case of failure: these birds did not thrive on bread and bruised turnip-seed, or such food as is generally given to the smaller hard-billed birds, the goldfinch, linnet, and others, and became so weak that they refused all sustenance. In this debilitated state we returned them to the nest on the 18th, and took the other two, which had prodigiously exceeded these in growth.

Observing on the side of the bill of one of the last taken, the *saltatoreal* leg of the common grasshopper, *Gryllus grossus*, it was a sufficient hint to procure as much as possible those insects for their food: and by the assistance of a little boiled flesh, beef or

* Whether it is unusual for this species to lay six eggs cannot be determined; but in the two or three other nests that have come within our knowledge, either with eggs or young, four or five only were found in them.

mutton.

mutton, varied with bread soaked in milk, and boiled rice, they throve considerably: but it was observable, when the weather was wet, and grasshoppers could not be procured, especially if the goodness of the meat was not carefully attended to, that they became visibly weak: such was the case at one time that they lost the use of their legs after they had become perchers, which we attributed to the defect of insect food, and the meat that was usually cut for them having in warm damp weather turned sour; for, on instant recourse to grasshoppers in greater abundance, with less and perfectly fresh meat, they were soon restored to the use of their limbs.

Before these captive birds were capable of flying, a person was sent to the nest to see what was become of the two which had been returned so weakly; as at this time indisposition confined us within doors, and prevented the furtherance of a design of decoying the parent birds to the house by means of their young if they should be found alive in the nest, of which we had some doubts; but we were agreeably surprised to find that they had not only recovered, but had acquired so much superior growth to those under the care of foster parents, that only one was secured: this proved to be a female, as was plainly discernible on comparison, and at once bespoke the other two to be males. At first this refused all sustenance (as is usual with all young birds after the age of discriminating their parents), but by the example of the others gaping for food, it soon became familiarized to the hand that fed it.

As soon as they could peck (as it is termed), that is, when they were capable of picking up their own food, it became requisite to find out a proper substitute for soft meat; and what was most likely to be the winter provision of these hard-billed birds was resorted to: common grain, such as wheat, barley, and oats, were presented to them, as well as groats or husked oats, at the same time

allowing

allowing them a certain portion of egg boiled hard, and boiled rice: of this variety the egg, rice, and groats, were only eaten.

It was now thought proper to try the smaller seeds, such as hemp, turnip, rape, plantain, grass, and such like; for which they soon discovered a taste, but always preferred the white oats, when the groats and softer food were removed; and which consequently became their principal diet: the adroitness with which they husked, or deprived that grain of its outer coat, in order to swallow the more nutritious part, was remarkable: and it was observable, that wheat and barley were at all times rejected.

With a view to produce a hybrid between a male Cirl Bunting and a female Canary-bird, such were put together; but unfortunate accidents put a stop to our curiosity: we learned however by this attempt that canary seed, which had never before been offered, was preferred by the Bunting to all others, even its favourite oat.

One of the males and the female lived long enough to throw out their full plumage, which was effected about the latter end of November, but the plumage of the male was never so bright as in its native wild state: the only indication of the sexes, in their first or nestling feathers, was the light-coloured mark over the eye, which in the male was much more conspicuous, and more inclining to yellow.

The male survived the female some months; was always sufficiently tame to take insects from the hand, showing great partiality to such a repast, and when let out of the cage would catch flies in the windows; but it was excessively timid and shy of strangers, and greatly alarmed at any moving object the eye had not been accustomed to: it particularly showed more than usual abhorrence to any thing black, not suffering even those out of whose hand it would otherwise feed to approach its cage with a

hat

hat on, without violent efforts to avoid the displeasing object, by fluttering about in an extraordinary manner; and in this way it lost its life.

We must also remark, that the monotonous song of the male was so incessant, and so shrill and piercing to the ear, that at times it became insufferable: it resembles so much the vociferous call-notes of the Lesser White-throat, *Sylvia sylviella*, that it requires more than ordinary knowledge in the language of birds not to be deceived. The female never uttered any thing but a simple plaintive note.

DARTFORD WARBLER.

Motacilla provincialis. *Gmel. Syst.* ii. *p.* 958.
Sylvia Dartfordiensis. *Ind. Orn.* ii. *p.* 517.
Dartford Warbler. *Lath. Syn.* iv. *p.* 437.
Warbler, Dartford. *Orn. Diction.*

In addition to the natural history of this bird, we beg leave to add, that we have observed it frequently in the southern parts of Devonshire since the 8th of September 1802, on which day several were seen; and the young readily distinguished from the adults by their paler plumage, even at a distance. These at times presented themselves to our notice till the latter end of January in the present year. Two that were shot about this time proved, by dissection, to be of different sexes; the plumage nearly alike, but rather darker in the male. In the gizzard were the *elytra* of some minute species of *Coleopterous* insects, and some small dark-coloured seeds.

They affect situations similar to those which we observed them to frequent in Cornwall; and no other place except in, or very contiguous to, thick furze, where they find the most secure shelter. They are not confined to one spot, but the most we observed were in a valley that opened to the sea, and not above two miles from it.

In

In other parts a few have been seen, but always within a few miles of the coast; and it is remarkable, in the very extensive tracts of furze with which this country abounds, that we could not meet with this bird, except in two or three places. Possibly their locality and shyness may have hitherto eluded our search for them in the breeding season; and hopes may yet be entertained of proving that they actually breed with us, if, as we are assured, they do in Provence; for we cannot reconcile their coming to us in the winter from a more southern climate.

Ringed Plover.

Charadrius Hiaticula. *Gmel. Syst. p.* 683. *Ind. Orn.* ii. *p.* 748.
Ringed Plover. *Br. Zool.* ii. *No.* 211. *Lath. Syn.* v. *p.* 201.
Plover, ringed. *Orn. Diction.*

In the *Ornithological Dictionary* it will be seen that some doubts are entertained whether the Alexandrian Plover, *Charadrius Alexandrinus* of Linnæus, and the Kentish Plover of Lewin, are not really varieties only of the Ringed Plover: such doubts cannot but exist with those who have had the same opportunity of examining the number of specimens we have at all times of the year; and we confess that additional and more recent observations have so strengthened our former conjectures, as to leave the mind with scarce the shadow of a doubt that they are actually one and the same species.

When the size and weight, the manners and habits of similar birds are consulted, and found to be the same; when the plumage of such is so nearly alike, except in a few markings, which are variable by age and season; when gradations are to be traced from the markings of one to that of the other, and when such birds always congregate together; we must be naturally led to conjecture,

conjecture, that naturalists, who have not had the opportunities of attending them in their native haunts, and have only examined a few individuals, perhaps in their extreme dissimilitude of plumage, might, without committing their scientific knowledge, describe them as a distinct species. It must, however, be acknowledged, that the actual criterion is the tracing of such doubtful subjects through their several changes, from the nestling to the adult: such has been our usual plan where opportunity permitted.

On the present question, were it not for the strong chesnut colour the Kentish Plover is said to possess on the crown of the head, as described by Lewin, and since by Dr. Latham in the Second Supplement to the *General Synopsis*, we should not have hesitated in pronouncing these three birds to be only one species; for the marks on which so much stress of discrimination and distinction is laid by some, particularly by the writers of a periodical publication, will by no means hold good, not only with respect to this, but also to many other species of birds, as we can prove from ocular demonstration. There is indeed nothing more vague and indeterminate than the colour of the legs and bill; a circumstance that has led already to much confusion, and of which we beg leave to put the young and unexperienced ornithologist upon his guard.

It would be endless to adduce instances of these uncertain marks, more or less changing by age and season, so well known to those who search for truth amongst Nature's native stores: the examples of the Black-headed and Herring Gulls, hereafter mentioned in this paper, are sufficient to show the care requisite in admitting the colour of those parts as the only specific distinction.

The colour, therefore, of the head alone, in what is described as the

Kentish Plover, is the only circumstance that could stagger our opinion; and we must still conjecture that the bird figured by Lewin is only an accidental variety; for it is admitted in the Second Supplement to the *General Synopsis* (the author of which sent the description to Lewin), that this part of the bird has its gradations. In the first described specimen the top of the head is ferruginous-brown; and with respect to the two other specimens, killed in the month of April, it is stated that "in one of them the whole nape was of a fine pale reddish bay, the other pale brown, inclining to bay towards the nape."

Here then we come as near as possible to the plumage of the generality of the Ringed Plovers in their adolescent state; for in every other part it exactly accords.

We shall now take leave of these birds, for the present, by remarking, that we have repeatedly taken the young of the Ringed Plover before it could fly, and, we believe, in all the usual intermediate changes of plumage in every month in the year; and we do assert, that in its infant state the legs and bill are not yellow, though paler than they are after it has attained the power of flying, when they become of a dusky brown, and continue that colour for a considerable time, changing by degrees to a yellow-brown, and lastly to an orange-yellow; but this last is never effected till the plumage is complete, and is always the last mark of perfection.

At this time (January) we have before us fresh specimens of this species, with all the marks of adults, except that the bill and legs do not possess the full yellow; at the same time we have others agreeing with the Alexandrian and Kentish Plovers, but with the crown of the head pale brown, some more or less tinged with rufous; and the white, which passes over the eye from the forehead, not quite running into the ring of that colour round the neck,

 but

but in some so near it as not to admit of a specific mark of distinction: the bill and legs dusky.

In cases of this nature we can only form opinions upon long and continued observations, noted with care and circumspection: upon such observations, therefore, we found our opinion, though it would be difficult to produce more than strong presumptive proof on such a question; but by pointing out our suspicions, we may stimulate others to join in the pursuit of investigating such abstruse subjects.

BLACK-HEADED GULL.

Larus ridibundus. *Gmel. Syst. p.* 601. *Ind. Orn.* ii. *p.* 811.
Black-headed Gull. *Br. Zool.* ii. *No.* 252. *Lath. Syn.* vi. *p.* 380.
Gull, black-headed. *Orn. Dictionary.*

From the very great confusion which seems to have arisen in some species of the Gull tribe, occasioned by a very considerable variation in plumage at different ages and seasons, we trust it will not be unacceptable to this Society and to the critical ornithologist, if from long and strict attention to several of this genus, which for many years have almost daily been presented to our view, we should endeavour to clear away a little more of that mist which has, for so long a period, veiled in obscurity those birds which are usually known by the names of Black-headed Gull, *Larus ridibundus*, Red-legged Gull, *Larus cinerarius*, Brown-headed Gull, *Larus erythropus*, Brown Tern, *Sterna obscura*, all of the Gmelinian system; and the Brown Gull of the Second Supplement to Latham's *General Synopsis*.

It is a claim which science has upon the naturalist—the endeavour to elucidate any of the more obscure objects of the creation: in our attempt, therefore, to throw light upon a subject which has caused so many various opinions, we beg leave to say, that

that from a long acquaintance with the objects in question, we have no scruple in asserting, that the three first and the last are, without doubt, one and the same species, and that the other has been confounded with it.

To those who are not well acquainted with the subject, it may appear arrogant and presumptuous to call in question the opinions of so many respectable authors; but we trust we shall, from an intimate acquaintance with the bird in question, in all its various changes from the young to the adult, be able to prove, and lay before the Society, sufficient grounds of reason for an opinion so greatly at variance with that of so many more able ornithologists.

In the *Ornithological Dictionary* we thought sufficient had been said, under the article Gull black-headed and red-legged, to have cleared away the greater part of such obscurity; but we since find in the work of our estimable friend, and one of the greatest ornithologists of the age, which made its appearance about the same time as the former (from which circumstance, unfortunately, no advantage could be reaped from that valuable source), that the Brown Gull, with reference to the Brown Tern of authors, is there given as a distinct species. It does not, however, appear that this author saw the bird in question, but that the description was sent to him by a very able naturalist, our late worthy and much to be lamented friend Mr. Boys; and a very accurate description it is. That the bird should have been considered by him as that which had been so long in obscurity under the title of Brown Tern, as handed down to us by Ray and Willughby, is not surprising; and that Dr. Latham should fall into such an opinion is not more extraordinary; on the contrary, it was very natural, and possibly this may be the identical bird: but be this as it may, it becomes requisite to show that the bird which now stands as a distinct species

species in the Second Supplement to the *General Synopsis*, under the title of Brown Gull, is no other than the Black-headed Gull in its adolescent state; and it becomes the more necessary to clear up this point, as it is stamped with such high ornithological authority, which might lay a foundation for more confusion in this very intricate class.

To point out the errors of our friends, for whom we have the highest regard, would, indeed, be a task ill suited to our pen, were we not, from long habits of intimate friendship with both these gentlemen, well aware of the purity of their writings, and that nothing would afford them more pleasure than the furtherance of science, by clearing up the doubts existing by well grounded facts.

In the former works of my friend Dr. Latham, he had been induced to fall into the opinion of other authors, and made some of the varieties of the Black-headed Gull distinct species. In his *Index Ornithologicus*, however, he has very judiciously brought the *L. cinerarius* and *erythropus* of Gmelin, together with the *ridibundus*, as mere varieties; but suffers the *Sterna obscura* to remain a distinct species, although he expresses a doubt whether it may not be a young of some one of the Tern or Gull genus.

Thus the Doctor had cleared away much of the obscurity; and it only remains to restore the Brown Gull to its proper place, as the young of the Black-headed species, and scarce differing in plumage from the state in which it is described as the Brown-headed.

Whether the Brown Tern of the older naturalists is a Tern or a Gull is perhaps a doubt; for, as the young of the former do not remain with us long after they are capable of flying, we cannot ascertain their several changes in plumage; though we ought, perhaps, to give them credit, and admit it was a Tern, but not a distinct

distinct species. So with respect to the Brown Gull, whether it is or is not the Brown Tern of older authors is of no importance, as at any rate it is an immatured bird, and alike ought to be expunged from the works on ornithology as a distinct species.

Since the perusal of Dr. Latham's last valuable work, we sent him the bird in question, bearing every mark of that described by him as the Brown Gull; and we believe the Doctor is thoroughly satisfied with our observations upon it.

It is indeed remarkable that a bird bearing such strong marks as the Black-headed Gull, in all the changes, from the nestling to the adult plumage, should have ever been multiplied into so many species; as it is in its various stages readily ascertained by the superior whiteness of many of the first quill feathers, especially on the outer webs, and the greater coverts immediately impending them; which is very conspicuous when the wings are extended, and an obvious distinguishing mark from all others, even when flying.

In order to elucidate the subject more clearly, we shall here subjoin a description of the several remarkable changes incident to the Black-headed Gull, which a long and intimate acquaintance from daily observation has warranted us to assert, and from which it will appear evident, that one of those mutations is the identical bird in question, the Brown Gull of the Second Supplement to the *General Synopsis*. In making any part of the history of this intricate class of birds more clear, by endeavouring to bring them into the limits of truly definable distinction, we do not arrogate superior knowledge on the subject, except so far as favourable situations, and a strict attention to a favourite pursuit, have conspired to develop truth and undeniable facts.

Without detailing the various synonyms of authors for this bird in its several changes of plumage, we shall only have recourse to

a few

a few quotations, particularly the *Ornithological Dictionary*, where references may be found under its various denominations; and to the *General Synopsis*, as well as to Gmelin's *Systema Naturæ*, for the more copious: and in order to render the subject more clear, we shall begin with a short description of the Black-headed Gull in its first, or nestling feathers, or as it first appears on our shores after having quitted its place of nidification; and trace it through the various changes till it arrives at full maturity, which we are inclined to believe, in this and some of the smaller species of the same genus, is effected in one year*.

In the first plumage the feathers are more or less mottled with brown and white, which in a short time after leaving the nest are displaced by those which are wholly white underneath; the head becomes white, with an obscure spot behind the ear; but the back scapulars and coverts of the wings continue mottled longer.

In this state, therefore, it comes nearest to the description of Ray's Brown Tern, which had the whole under side white; the upper brown; the wings partly brown, partly ash-colour: but then he expressly says the head is black; a circumstance which never occurs in this bird while it has any brown feathers remaining on its back, and therefore cannot be referred to.

The second material change brings it to the Brown Gull, *Lath. Syn. Sup.* ii. *p.* 331. to which we refer for a comparative description; and which so exactly accords with the following, taken from a recent specimen we killed on the 12th of February last on purpose to send to Dr. Latham, that there can be no doubt of their being the same.

* Many of the larger species are, no doubt, three years or more becoming perfect: a Herring Gull, which has now been four years and a half in our possession, still retains a few black markings down the shafts of the tail feathers; the head and neck streaked with dusky; and the bill pale, indicating a change to yellow, but the tip still dusky.

Length

Length, thirteen inches and a half; breadth, thirty-seven; weight, eight ounces and three quarters. The bill one inch and a quarter in length to the feathers on the forehead; the base red orange, tip dusky black; irides dusky: a black spot at the anterior corner of the eye; another behind the ear; crown of the head mottled dusky and white; forehead, and all the under part, white; back of the neck grayish-white: back, scapulars, greater coverts of the secondary quills, and some of the upper series of the smaller ones near the shoulder, gray: several rows of the middle series of coverts brown, edged with dull white; the two first prime quills are white, margined on both webs with black; in the third the white increases on the outer margin, and the black at the tip; and at the fifth feather the white part becomes pale gray, and the dark parts increase on the inner web, and become more dusky; secondary quills dusky near their ends, margined with gray; tertials brown; the feathers of the spurious wing are dusky, slightly tipped with white: the ridge of the wing below that, and the three or four larger coverts adjoining, are wholly white; the rest of the greater coverts, impending the prime quills, more or less brown: the outer feather of the tail quite white, the next with two black, or rather dusky-brown, spots at the tip; the rest white, tipped with the same for rather more than half an inch, the ends slightly edged with dirty white: legs and feet dull orange-red.

The next change brings it to the Brown-headed Gull. *Lath. Syn.* vi. *p.* 383. Larus erythropus *Gmel. Syst.* ii. *p.* 597. Larus ridibundus *Ind. Orn.* ii. *p.* 812. *var.* γ. and in the *Orn. Diction.* will be found under Gull-brown-headed to refer to Gull-black-headed.

In this there is no material difference from the last, except that the legs have attained their perfect colour (red), and the head

 assumes

assumes more of the dusky or brown feathers than usual; while the middle coverts of the wings retain the mottled brown, and the tail the dusky bar at the end. This, though we consider it as an irregular change, may be admitted as an unusual variation in the gradations commonly observed; for scarce an instance is to be found but what the brown scapulars and middle series of the wing coverts are changed for those of gray, and the tail becomes wholly white before the head is so much as covered with dusky feathers, or the legs become more than reddish.

The fourth change is that which has been generally known by the Red-legged Gull. *Lath. Syn.* vi. *p.* 381. Larus cinerarius *Gmel. Syst.* ii. *p.* 597. Larus ridibundus *Ind. Orn.* ii. *p.* 812. *var. β.* and in the *Orn. Diction.* is given under the title of Gull-red-legged with a reference to Gull-black-headed.

In this change, which brings it so near maturity, we find a very material difference; for not only the scapulars and coverts of the wings are become gray, but the bar at the end of the tail is lost, and that part assumes a pure white; the legs and bill also become of a fine purplish red; these last, however, grow darker as the spring advances, and the black increases on the head, a circumstance we believe peculiar to the breeding season, when that colour spreads over the whole of the head, taking in the throat; and in this, the most perfect or adult state, it is the Black-headed Gull. *Lath. Syn.* vi. *p.* 380. Larus ridibundus *Gmel. Syst.* ii. *p.* 601. *Ind. Orn.* ii. *p.* 811. 2. and the Gull-black-headed of the Ornithological Dictionary.

Having now traced the Black-headed Gull through its various stages of plumage, after long experience and investigation, we trust the numerous synonyms will, in future works on Ornithology, be concentred to one species, *Larus ridibundus.*

THORACIC

Cepola rubescens

E.D. del.

THORACIC FISH.

CEPOLA RUBESCENS.

Gmel. Syst. iii. *p.* 1187.

Turt. Linn. i. *p.* 739.

Tab. XVII.

Long, slender, smooth, subpellucid, somewhat compressed sideways, tapering from the head gradually to the tail: head not larger than the body, sloping from the eye to the end of the upper jaw: the under jaw longest, sloping upwards; mouth large; both jaws furnished with one row of distant, subulate, curved teeth at their very edge, the front ones projecting forward: eyes large, placed high up in the head; irides silvery mixed with crimson; pupil blue-black; gill coverts composed of two plates; branchiostegous rays four: pectoral fins small, rounded, consisting of sixteen rays: ventral small, oval, with six rays; the first short and spiny, with a filament adjoining longer than the other rays, and detached from them; these fins are close together, and rather before than immediately under the pectorals: the dorsal fin commences just behind the head, immediately above the opening of the gills, and continues without a division to join the tail, consisting of about seventy rays: the anal fin commences just behind the vent, which is scarce an inch from the ventral fins, and continues, like the dorsal, to join the tail; this has about sixty-one rays: the caudal fin is lanceolate, the middle ray being much the longest and gradually shortening on each side, till the distinction is lost in the dorsal and anal fins, and is composed of about twelve rays: the tongue is short, and with the palate is smooth; lateral line a little curved near the head, and afterwards runs quite

 straight

straight to the tail: skin smooth, but when examined by a lens appears finely punctured.

Colour pale carmine, darkest above and towards the tail; gill plates and undulated transverse lines along the sides, silvery; fins of the same colour as the body, except the ventral, which are nearly white.

Length, ten inches; depth behind the head rather more than three quarters of an inch; breadth, half an inch.

The specimen of this elegant fish, from which the description and annexed figure were taken, was caught in Salcomb bay, on the south coast of Devonshire, on the 25th of February 1803.

It appears to differ a little in the characters given of the genus, for it has only four branchiostegous rays; but we suspect this circumstance is not always to be depended on.

Gmelin seems inclined to think this a variety of *Cepola Tænia*; but that is out of all question, as the body of this species is not carinated on each side, nor has the lower jaw a double row of teeth; and in other particulars it differs*.

Toothed Gilthead.

Sparus niger. *Turt. Linn.* i. *p.* 789.

Brama marina cauda forcipata. *Raii Syn. Pisc. p.* 115. *n.* 4. *Will. Icth. t.* V. 12.

Sparus Raii, La Castagnole. *Bloch. Ichth. Pt.* 8. *p.* 75. *pl.* 273.

La Castagnole. *Duham. Trait. de Pech. t.* 3. *p.* 26. *pl.* 5. *f.* 1.

Toothed Gilthead. *Br. Zool.* iii. *p.* 243. *t.* 43.

* Since the above was written, another specimen was brought to us from the same place: this was taken on the 25th of March. It was an inch longer, but not quite so deep; the branchiostegous and fin rays corresponded exactly; the colour was rather darker, and the base of the dorsal fin inclining to orange. This is probably a male, the other a female.

This

This extremely rare species of *Sparus* (of which we believe there is only one solitary instance on record of its being found on the British coast, and that above a century ago at the mouth of the Tees in Yorkshire,) was taken alive in November 1799, in the inlet that runs up to Kingsbridge on the south coast of Devon, and is now in our possession.

This fish was left by the tide, and was taken by a cottager, who had embowelled it, and was preparing to dress it, when it was fortunately saved; but the weight could not be ascertained.

The length, to the end of the tail, sixteen inches, of which the caudal fin is four; depth, five inches: breadth of the back not above two. The description and excellent figures of some of the authors referred to, render it unnecessary to enter into a minute description: it did not appear to have been so blue on the back as Bloch's figure represents; but the belly was silvery: the caudal fin, as well as the dorsal and anal, is imbricated with small scales almost to the end of the rays: in the upper jaw, besides the row of larger teeth, there are numerous minute ones behind: at the base of the ventral fins on the outside of each is a spurious fin, or slender appendage.

BRANCHIOSTEGOUS FISH.

Bimaculated Sucker.

Cyclopterus bimaculatus. *Turt. Linn.* i. *p.* 907.
Bimaculated Sucker. *Br. Zool.* iii. *App. p.* 397. *t.* 22.

This elegant little fish, first noticed by the Duchess Dowager of Portland, was taken at Weymouth, and communicated to Mr. Pennant. Whether it has been observed on any other part of our coast does not appear; we therefore beg leave to remark, that we have frequently taken it by deep dredging at Torcross in Devonshire.

vonshire, adhering to stones and old shells; and have kept several alive for a day or two in a glass of sea water.

In this situation they always adhered to the sides of the glass, by the apparatus termed the sucker, and frequently remained fixed till they died; and even after death the power of adhesion continues; the wet finger being applied to the part, the fish becomes suspended: when alive they instantly attach themselves to the hand if taken out of the water*.

This species of *Cyclopterus* rarely exceeds an inch and a half in length: the head is broad, and the body tapers much to the tail; the colour is pink and white in minute spots, which, to a common observer, appears all pink: the skin is perfectly smooth; mouth small; teeth small and regular; irides pink, gold on the inner circle, pupil dark blue; pectoral fins broad, extending down on each side and joining the sucker; anal fin small, situated near the tail: dorsal fin far behind, corresponding to the anal; caudal fin narrow, even at the end; on each side of the body, just behind the pectoral fin, is a purple spot, surrounded by a ring of white, the character from whence the trivial name was taken, and which appears to be an invariable mark.

Mr. Pennant calls these spots black; and also says the fins are whitish: possibly he had never seen it alive, though it is remarkable for preserving its beautiful pink colour in spirits.

* The Jura Sucker, *Br. Zool. No.* 59. equally adheres to the hand when taken up. This species is plentiful on the rocks of Milton on the same coast, but only to be obtained at low water: not found with the other, nor taken by the dredge.

XIX. *Biogra-*

XIX. *Biographical Memoirs of several Norwich Botanists, in a Letter to Alexander MacLeay, Esq. Sec. L.S.*

By James Edward Smith, M.D. F.R.S. P.L.S.

Read January 17, 1804.

DEAR SIR, Norwich, Jan. 14, 1804.

THE recent death of one of my oldest botanical friends, who has long been a Fellow of the Linnean Society, has suggested some recollections to me which may not be altogether uninteresting, and which I beg the favour of you to communicate to the Society.

Mr. John Pitchford, whose name is well known to all who are conversant with the botany of England, died here on the 22d of December 1803, aged 66 years. He had long practised as a surgeon and apothecary in this town and neighbourhood, especially among the catholics, being himself of that persuasion. His moral character and truly christian spirit would have done honour to any church or sect, and he has left five children to lament the loss of a most indulgent father. I could add more on this subject, but his scientific character is more especially my present object.

Mr. Pitchford was the last of a school of botanists in this town, among whom the writings and merits of Linnæus were perhaps more early, or at least more philosophically, studied and appreciated, than in any other part of Britain. Norwich had long, indeed, been conspicuous for the love of plants. A play is extant, called Rhodon and Iris, which was presented at the florist's feast in Norwich, and printed in 1637. The taste for the cultivation of flowers was, probably, imported from Flanders, along with our worsted

worsted manufacture, during the equally unchristian and unwise persecutions of the bloody Philip II. Such an innocent luxury, and so pure a taste, were not unworthy of minds which had turned, with disgust, from the tyranny and foul corruption of their native country. Truth, virtuous liberty, and disinterested science, are congenial, and flourish under the influence of similar circumstances.

The great Sir Thomas Browne, well known by his various learned writings, who died here in 1682, appears not to have neglected botany. The *Salsola fruticosa* was first observed by him on the Norfolk coast. It does not, however, appear that systematic botany was particularly studied in Norwich till towards the latter end of the 18th century. There was indeed a set of botanists, very distinct from the florists, though, like them, mostly in humble life, who amused themselves in herborizing in the country, and who referred their discoveries to the names and descriptions of old English authors, particularly Gerarde and Parkinson, sometimes, perhaps, to Ray. Some of these are still in being, and a Society, founded many years ago, now exists. But the numbers of these, properly called botanists, have always been very inconsiderable compared with the cultivators of fine flowers, who among the journeymen weavers, and other persons employed in the manufacture, are very numerous, and I believe very successful. The long intercourse between this county and Holland has been favourable to their pursuit.

The oldest name I have been able to discover among the botanists is that of Mr. Wilson, a tailor, who made frequent journeys to London about the years 1738 and 1740. Part of his Herbarium, very scientifically named, has fallen into my hands. From thence it appears that he collected and dried many plants from the Physic Garden at Chelsea, and from Gray's nursery at Fulham. Among his

his pupils were Mr. Christopher Smart, of the same profession, and Mr. Christopher Newman, a man in a more elevated situation in life, both living in my time; as well as Mr. William Humfrey. To the latter, an amiable and communicative man, I have many obligations. He first discovered the *Lycoperdon phalloides* of Mr. Woodward, the *Batarrea* of Persoon, a most singular fungus, not known out of this neighbourhood. I shall mention only one more of these humble cultivators of science, Mr. Joseph Fox, a weaver, of whom mention is made in the 2d volume of our Transactions, p. 315, as the first person who ever raised a *Lycopodium* from seed. He is still living, at a very advanced age, and, without much help from books, has as discriminative a knowledge of our wild plants as most botanists who have made a noise in the world.

"The short and simple annals" of these humble and disinterested admirers of Nature may seem perhaps scarcely worthy the attention of the learned and accomplished naturalist; but those who have the best claim to such a denomination will feel most interest in the success of their fellow labourers, how far soever below their own. It appeared to me unjust to pass over in silence those whose taste at least, and perhaps their knowledge, first excited to similar pursuits the more distinguished botanists of whom I am now to speak.

Some time about the year 1764, if I remember rightly, the Rev. Henry Bryant, at that period one of the ministers of the principal parish here, took up the study of botany as an amusement to his mind after the death of a beloved wife. He was a man of singular acuteness, well skilled in the mathematics, and sufficiently master of his time to devote a considerable portion of it to his new pursuit. He was acquainted with Mr. Hugh Rose, then resident as an apothecary in Norwich, who had always had a taste for botany, and with much classical learning, added to a

 systematic

systematic and physiological turn of mind, was well qualified to assist Mr. Bryant in the study he had undertaken. Mr. Rose, however, educated in Scotland, was chiefly acquainted with Ray and Tournefort. The famous Dr. Garden was his fellow-student, who, when settled in America, and engaged in studying the plants of that country by the principles of Tournefort, was, as he himself told me, very near giving up the study altogether, for want of a more comprehensive system. Fortunately the works of Linnæus came into his hands, and the use he made of them is well known. Perhaps about the same period our two Norwich botanists first met with the *Philosophia Botanica*. Both of them have often related to me, with singular pleasure, the impression they received from this book. At first they scarcely knew what opinion to form of it. Mr. Rose was not, I believe, without apprehension of some lurking heresies and unfounded novelties, hostile to the fame of his admired Ray; but Mr. Bryant, unattached to any previous system, and much attracted by the mathematical precision of the new book, after reading it again and again, became a decided Linnæan, in which his friend soon most heartily coincided with him. They procured as soon as possible all the other principal writings of Linnæus, as well as the *Flora Anglica* of Mr. Hudson. Mr. Pitchford, then a student of physic in London, was acquainted with this gentleman, and by his mediation a correspondence began between Mr. Hudson and Mr. Rose, which lasted as long as the latter lived. Mr. Pitchford in 1769 settled in Norwich, and added much to the strength of its botany. Mr. Rose in 1775 published his *Elements of Botany*, a translation and epitome of many of the most useful introductory and theoretical writings of Linnæus. In an appendix to this volume some new British plants, found about Norwich by Mr. Pitchford, Mr. Humfrey, and others, are figured and described. Mr. Rose, like Mr.

Hudson,

Hudson, transcribed synonyms very copiously without seeing the original books; but that practice has been universal among local botanists till very lately, and, however disgraceful now, was much more excusable when Mr. Rose wrote. The principal part of his work is highly valuable, full of solid information, and not superseded by any other English publication.

I can never forget the kind assistance I received from this worthy man, when, having always had a passion for plants, I became desirous, at the age of 18, of studying botany as a science. The only book I could then procure was Berkenhout, Hudson's *Flora* having become extremely scarce. I received Berkenhout on the 9th of January 1778, and on the 11th began, with infinite delight, to examine the *Ulex europæus*, the only plant then in flower. I then first comprehended the nature of systematic arrangement and the Linnæan principles, little aware that at that instant the world was losing the great genius who was to be my future guide, for Linnæus died in the night of January 11th 1778. With Berkenhout and a parcel of wild flowers in my hands, I had often recourse to Mr. Rose during the ensuing summer. But, alas! in the following year a gutta serena deprived him of his sight. This affliction, so peculiarly severe to a naturalist, he bore with exemplary patience; for though with the loss of his external visual organs he lost his darling amusement, none could ever derive more consolation than himself from looking within. During the few remaining years of Mr. Rose's life, his delight was to assist young people in their classical or botanical studies, and he was always attended by some one or other eager to profit of his conversation. He had long formed the plan of a popular work on the uses of plants; and though unable to execute his intention altogether himself, he suggested the scheme to Mr. Charles Bryant, brother to the gentleman above mentioned, an excellent and industrious

 practical

practical botanist. This was the origin of the *Flora Dietetica*, published in 1783. It was dedicated to Mr. Crowe, who had for some years, as well as several other gentlemen of Norwich, embraced with ardour the study of British botany. The Rev. Mr. Bryant was by this time settled at his living of Heydon; from whence he afterwards removed to Colby in Norfolk, where he died at an advanced age in 1799, having never experienced any diminution of his fondness for botanical pursuits. Mr. Hudson and Mr. Lightfoot were, as long as they lived, his constant correspondents. Mr. Charles Bryant died before his brother.

Mr. Pitchford, therefore, was the only survivor of the original Linnæan school of Norwich. He had also been a frequent correspondent of the authors of the *Flora Anglica* and *Flora Scotica*. But though an admirer of Linnæus, he was always peculiarly partial to Ray; and though ever so well acquainted with a plant by its Linnæan name, he could never rest while any obscurity enveloped it in the works of Ray. The *Carices* and *Menthæ* more particularly engaged Mr. Pitchford's attention; and it must be confessed the study of them on his plan, of scrutinizing synonyms without access to any old English herbarium, was not soon to be exhausted. No wonder, therefore, that his conversation and epistolary correspondence on these subjects found no end. Nothing, however, could be more candid and amicable than his discussions. In the last interview I had with him, he was particularly strenuous with me to separate the *Mentha hirsuta*, with capitate flowers, from the verticillate, *M. sativa*. I think it but just to record the opinion of so indefatigable a practical observer, though my own remains unshaken. As some years have now elapsed since the Linnean Society published my paper on Mints, I take this opportunity of observing, that subsequent experience has strongly confirmed the solidity of the characters taken from the pubes-

cence

cence of the calyx and flower-stalk, and I find botanists in general can now, easily enough, make out any mint that comes in their way. On this point, indeed, my late friend was sufficiently disposed to be partial to me, as he always was in every instance in which he could give me credit, or do me any service. A very few days after the above conversation

——————————" he gave
His blessed part to Heav'n, and slept in peace.
So may he rest! his faults lie gently on him!"

I wish the foregoing particulars may afford the Society any entertainment, and am always,

Dear Sir,

Your faithful friend

And very obedient servant,

J. E. SMITH.

XX. *Further*

XX. *Further Account of the Bos Frontalis* (*p.* 57).

By Aylmer Bourke Lambert, Esq. F.R.S. V.P.L.S.

Read February 7, 1804.

SINCE I presented to the Society the last account of the *Bos Frontalis*, or *Gyall* of India, Mr. Fleming, a gentleman who is just returned from that country, has very obligingly communicated to me the following further particulars relative to that animal. This account was transmitted to Mr. Fleming by Mr. Macrae, resident at Chittagong, in a letter dated March 22d 1802, and was accompanied with a drawing, by which it appears that the animal from which my figure (Tab. IV.) was taken was full-grown.

The Gyall is a species of cow peculiar to the mountains which form the eastern boundary of the province of Chittagong, where it is found running wild in the woods; and it is also reared as a domestic animal by the Kookies, or Lunclas, the inhabitants of those hills. It delights to live in the deepest jungles, feeding on the tender leaves and shoots of the brushwood; and is never met on the plains below, except when brought there. Such of them as have at any time been kept by the gentlemen at Chittagong have always preferred browsing among the thickets on the adjacent hills to feeding on the grass of the plains.

It is of a dull heavy appearance, yet of a form that indicates both strength and activity; and approaches nearly to that of the wild buffalo. Its head is set on like the buffalo's, and it carries it much in the same manner, with the nose projecting forward;

ward; but in the shape of the head it differs considerably from both the buffalo and cow, the head of the gyall being much shorter from the crown to the nose, but much broader between the horns than that of either. The withers and shoulders of the gyall rise higher in proportion than those of the buffalo or cow, and its tail is small and shorter, seldom falling lower than the bend of the ham. Its colour is in general brown, varying from a light to a deep shade: it has at times a white forehead and white legs, with a white belly and brush. The hair of the belly is invariably of a lighter colour than that of the back and flanks. The gyall calf is of a dull red colour, which gradually changes to a brown as it advances in age.

The female gyall receives the bull at the age of three years; her term of gestation is eleven months, when she brings forth, and does not again admit the male until the second year thereafter; thus producing a calf once in three years only. So long an interval between each birth must tend to make the species so rare. In the length of time she goes with young, as well as in that between each conception, the gyall differs from the buffalo and cow. The gyall does not give much milk, but what she yields is nearly as rich as the cream of other milk. The calf sucks his dam for eight or nine months, when he is capable of supporting himself. The Kookies tie up the calf until he is sufficiently strong to do so.

The gyalls live to the age of from fifteen to twenty years: they lose their sight as they grow old, and are subject to a disease of the hoof, which often proves fatal at an early age. When the Kookie considers the disease beyond the hope of cure, he kills the gyall and eats the flesh, which constitutes his first article of luxury.

The Kookies have a very simple method of catching the wild gyalls. It is as follows: On discovering a herd of wild gyalls in the

the jungles, they prepare a number of balls, of the size of a man's head, composed of a particular kind of earth, salt, and cotton; they then drive their tame gyalls towards the wild ones, when the two soon meet and assimilate into one herd, the males of the one attaching themselves to the females of the other, and *vice versa*. The Kookies now scatter their balls over such parts of the jungle as they think the herd most likely to pass, and watch its motions. The gyalls, on meeting these balls as they go along, are attracted by their appearance and smell, and begin to lick them with their tongues; and relishing the taste of the salt, and the particular earth composing them, they never quit the place until all the balls are destroyed. The Kookies having observed the gyalls to have once tasted their balls, prepare what they consider a sufficient supply of them to answer the intended purpose, and as the gyalls lick them up they throw down more; and to prevent their being so readily destroyed they mix the cotton with the earth and salt. This process generally goes on for three changes of the moon, or for a month and a half; during which time the tame and wild gyalls are always together licking the *decoy* balls; and the Kookie, after the first day or two of their being so, makes his appearance at such a distance as not to alarm the wild ones. By degrees he approaches nearer and nearer, until at length the sight of him has become so familiar that he can advance to stroke his tame gyalls on the back and neck without frightening away the wild ones. He next extends his hand to them, and caresses them also, at the same time giving them plenty of his decoy balls to lick; and thus in the short space of time mentioned he is able to drive them along with his tame ones to his parrah, or village, without the least exertion of force or coercion: and so attached do the gyalls become to the parrah, that when the Kookies migrate from one

place

place to another they always find it necessary to set fire to the huts they are about to abandon, lest the gyalls should return to them from the new grounds, were they left standing. Experience taught the Kookie the necessity of thus destroying his huts.

It is a fact worthy of remark, that the new and full moon are the periods at which the Kookies generally commence their operation of catching the wild gyalls, from having observed that at these changes the two sexes are most inclined to associate. The same observation has been often made to me by our elephant catchers.

 XXI. *Descrip-*

XXI. *Description of a large Species of Rat, a Native of the East Indies.* *By Captain Thomas Hardwicke, F.L.S.*

Read February 7, 1804.

I BEG leave to offer to the notice of the Linnean Society a brief description of a large species of rat, a native of the East Indies, which is mentioned by the late Mr. Pennant, in his *History of Quadrupeds*, (3d ed.) Volume II, No. 377. It is also noticed by Dr. Shaw in his *General Zoology*, under the name of *Mus malabaricus**; but, as it is the largest of the known species of this genus, and is not peculiar to the coast of Malabar, it may, perhaps, with more propriety be named

MUS GIGANTEUS.

TAB. XVIII.

The *nose* is rounded; the under jaw much shorter than the upper: cutting teeth broad, incurvated, compressed; the lower ones measuring eight-tenths of an inch, and the upper four-tenths in length.

The *ears* naked, large, ovate, much rounded, erect, with the margins a little turned inwards.

The *body* is thick, and much arched; the upper part is most hairy and black; the lower inclining to gray.

* Mus griseus, auriculis rotundatis nudis, digitis plantarum exterioribus brevioribus. *Shaw's Zool. Vol.* ii. *Part* i. *p.* 54.

The

The *legs* and *toes* black; toes all divided to their origins; claws strong, and of moderate length; on the fore feet the rudiment of a thumb, with a blunt claw; the fifth of the hind foot larger, and more remote from the rest.

The *tail* is thinly covered with hair; the last inch naked, and differing in colour from the rest: at the root $2\frac{1}{2}$ inches in circumference, and at the tip six-tenths only; somewhat scaly, and marked the whole length with numerous obscure rings.

A faithful figure of the natural size, taken from a living subject, accompanies this paper; and will, it is hoped, supply the want of a more minute description.

The subject here described and figured was a female. Its weight was two pounds eleven ounces and a half. Its total length $26\frac{1}{4}$ inches, of which length the tail measured, from root to tip, 13 inches. The male grows larger, and weighs three pounds and upwards.

This rat is found in many places on the coast of Coromandel, in Mysore, and in several parts of Bengal, between Calcutta and Hurdwar. It is partial to dry situations, and hardly ever found distant from habitations. The lowest cast of Hindoos eat the flesh of this rat, in preference to that of any other species.

It is a most mischievous animal, burrows to a great depth, and will pass under the foundations of granaries and store-houses, if not deeply laid. Mud or unburnt brick walls prove no security against its attacks, and it commonly perforates such buildings in all directions. It is destructive in gardens, and roots up the seeds of all leguminous plants sown within its haunts. Cucurbitaceous plants and fruits also suffer by its depredations. When grain and vegetables are not within its reach, or scarce, it will attack poultry; but the former is its choicest food.

 The

The bite of this animal is considered dangerous, and an instance of its effects came under my notice while at the military station of Futtehgurh, in the Dooab, where an European in the Honourable East India Company's artillery died under a confirmed hydrophobia in about twelve days after having been bitten by a rat. This opinion I rest upon the judgment of the medical gentleman who attended the unfortunate man subsequently to the accident.

XXII. Ex-

XXII. Extracts *from the* Minute-Book *of the Linnean Society of London.*

Jan. 5, 1802. Mr. Lambert, V.P.L.S., laid before the Society some specimens of the *Agrostis linearis* of Koenig, Retzius, and Willdenow (the *Durva* of the Hindoos), which he received among a large collection of Indian Grasses from Dr. Roxburgh. This is the grass which is figured in the 4th Volume of the *Asiatic Researches*, and so much celebrated by the late Sir William Jones for the great beauty of its flowers, and for its sweetness and nutritious quality as pasture for cattle; but Mr. Lambert observes that on his first seeing it he immediately suspected it to be the *Panicum Dactylon* of Linnæus; and upon comparing it with fine specimens in the Banksian Herbarium, it proves to be the same. Although this plant grows sparingly in Cornwall, yet it is never found there in the same perfection as in the south of Europe, or in the East Indies; and Mr. Lambert thence conjectures that it is not originally a native of England.

Dec. 20, 1803. Mr. Templeton, A.L.S. of Orange-Grove near Belfast, in a letter to Mr. Dawson Turner, F.L.S., mentions that the White-winged Cross-bill, *Loxia falcirostra* of Latham, was shot within two miles of Belfast, in the month of January 1802. It was a female, and perfectly resembled the figure in *Dixon's Voyage to the North-west Coast of America.*

Feb.

Feb. 21, 1804. Mr. Dryander, Vice President in the chair, reported that the Right Honourable Sir Joseph Banks, Bart. K. B. H. M. L. S., had presented to the Society the whole of his very valuable collection of Insects, and that it was this day removed to the Society's apartments.

Mar. 6. Read a letter from the President, stating a curious observation relative to the musical intervals in the notes of the Cuckoo, communicated by an eminent professor at Norwich. This gentleman has invariably found the Cuckoo to begin early in the season with the interval of a *minor third.* The bird then proceeds to a *major third*, next to a *fourth*, then a *fifth*; after which his voice breaks, without his ever attaining a *minor sixth.*

Mar. 20. Mr. Sowerby, F. L. S., presented a Sketch of the Head of a new species of Whale or Cachelot, of the natural size, found in the month of September last, stranded on the estate of James Brodie, Esq. F. L. S., in the county of Elgin. Mr. Sowerby states that the whole animal was sixteen feet long, and proposes that it may be named *Physeter bidens.*

CATA-

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Continued from Page 394 of Vol. VI. of the Society's Transactions.

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534. ALLIONI (C.) Rariorum Pedemontii Stirpium Specimen primum. Augustæ Taur. 1755, 4to.
535. D'Ancora (Gaetano) Ricerche filosofico-critiche sopra alcuni fossili metallici della Calabria. Livorno, 1791, 8vo.
536. Bridgman's (William) Translations from the Greek. London, 1804, 12mo.
537. Dandin (F. M.) Traité d'Ornithologie, tom. 1. & 2. Paris, 1800, 4to.
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539. Dioscoridis de Medicinali Materia Libri Sex, Joanne Ruellio Interprete. Lugduni, 1552, 8vo.
540. Donn's (J.) Hortus Cantabrigiensis, ed. 3. Cambridge, 1804, 8vo.
466. Donovan's (E.) Epitome of the Natural History of the Insects of India, No. 8—14. London, 1802—4, 4to.
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544. Forster's (T. F.) List of the rare Plants found in the Neighbourhood of Tunbridge Wells, 1801, 12mo.
545. Franzii (Wolfgangi) Animalium Historia sacra. Amstelodami, 1643, 18mo.
546. Freyer (S. G.) Dissertatio de Lythro salicaria. Gottingæ, 8vo.

547. Gilibert

547. Gilibert (J. E.) Præside, Exercitium Botanicum in Schola Universitatis Vilnensis. 12mo.
548. Haworth (A. H.) Lepidoptera Britannica, et Dissertationes variæ ad Historiam Naturalem spectantes. Londini, 1804, 8vo.
549. Hedwig (R. A.) Commentatio de Tremella Nostoch. Lipsiæ, 1798, 4to.
550. Heinsii (U.) Dissertatio de Alce. Jenæ, 1697, 4to.
551. Hunter's (A.) Georgical Essays, 4 vols. London, 1803, 8vo.
552. Kirby's (William) Monographia Apum Angliæ, 2 vols. Ipswich, 1802, 8vo.
553. Knapp's (J. L.) Gramina Britannica, or Representations of British Grasses. London, 1804, 4to.
554. Konig (C.) and J. Sims' Annals of Botany, part 1. London, 1804, 8vo.
555. Lacepede (B. G. E.) Notice Historique sur la Vie et les Ouvrages de Dolomieu. Paris, 1802, 8vo.
556. Lambert's (A. B.) Description of the Genus Pinus, illustrated with Figures. London, 1803, folio.
557. Lister (M.) Exercitatio Anatomica de Cochleis. Londini, 1694, 8vo.
558. Ludwig (C. G.) Institutiones Historico-physicæ Regni Vegetabilis. Lipsiæ, 1757, 8vo.
559. Luidii (E.) Lithophylacii Britannici Iconographia. Oxonii, 1760, 8vo.
560. Marsham (T.) Entomologia Britannica, tom. 1. Coleoptera. Londini, 1802, 8vo.
301. Martyn's (T.) Gardener's and Botanist's Dictionary, by the late Philip Miller, corrected and newly arranged, with Additions. Part 17.
561. Montagu's (G.) Testacea Britannica, 2 vols. Romsey, 1803, 4to.
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563. Pallas (P. S.) Flora Rossica, tom. 1. Petropoli, 1784, folio.
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566. Sachs a Lewenheimb (P. J.) Γαμμαρολογια. Francof. 1665, 8vo.
567. Schumacher (C. F.) Verseich eines Verzeichnisses der in den Dänisch-Nordischen Staaten sich findenden einfachen Mineralien. Copenhagen, 1801, 4to.
514. Smith (J. E.) Flora Britannica, vol. 3. Londini, 1804, 8vo.
377. Smith and Sowerby's English Botany, vol. 15—19. London, 1802—4, 8vo.
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570. Stackhouse's (J.) Nereis Britannica, Fasciculus 3.
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Thunberg

Thunberg (C. P.) Præside, Dissertationes academicæ :

399. Museum Naturalium Academiæ Upsaliensis. Append. 8.

405. Genera nova Plantarum, partes 10—16.

572. Observationes in Pharmacopœiam Suecicam.

573. Fructificationis Partium Varietates, partes 2.

574. Aspalathus, partes 2.

575. Falco canorus.

576. Observationes nonnullæ in Historiam naturalem Smolandiæ.

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579. Turner's (D.) Synopsis of British Fuci, 2 vols. Yarmouth, 1802, 8vo.

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581. Vaucher (J. P.) Histoire des Conferves d'Eau douce. Geneve, 1803, 4to.

582. Walckenaer (C. A.) Faune Parisienne (Insectes), tom. 1 & 2. Paris, 1802, 8vo.

583. Withering's (W.) Chemical Analysis of the Water at the Caldas da Rainha. Lisbon, 1795, 8vo.

438. Philosophical Transactions of the Royal Society of London for 1801—1803. London, 4to.

584. Transactions of the Royal Irish Academy, vol. 1—9. Dublin, 1787—1803, 4to.

585. Transactions of the American Philosophical Society, vol. 1—5. Philadelphia, 1771—1802, 4to.

528. Asiatic Researches, vol. 7. Calcutta, 1801, 4to.

439. Transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce, vols. 20 and 21. London, 8vo.

530. Journals of the Royal Institution, No. 8—16. London, 8vo.

586. Miscellanea Philosophico-Mathematica Societatis Regiæ Taurinensis, tom. 1—3. Augustæ Taurinorum, 1759—1766, 4to.

587. Catalogue of Plants in the Dublin Society's Botanic Garden at Glassneven. Dublin, 1802, 8vo.

588. Catalogus Plantarum secundum Materiam Medicam Collegii Regalis Londinensis in Horto Chelseano.

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